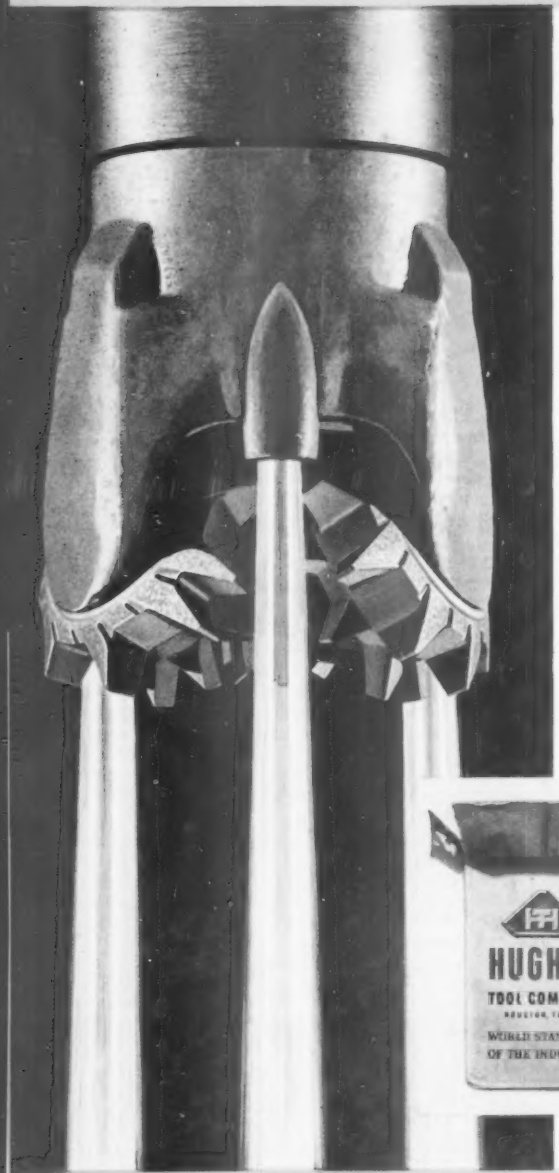
the OIL AND GAS JOURNAL



FACTS ABOUT HUGHES HIGH VELOCITY JET ROCK BITS

Hughes Jets are field-proven . . . and the product of several years of concentrated research. Their development started in 1948 in co-operation with the drilling industry.

Thousands of Hughes Jet Bits have been run under the close supervision of Hughes research and development engineers . . . and in virtually every active drilling area. Their penetration rate and footage per bit have been phenomenal in formations of low to medium compressive strength.

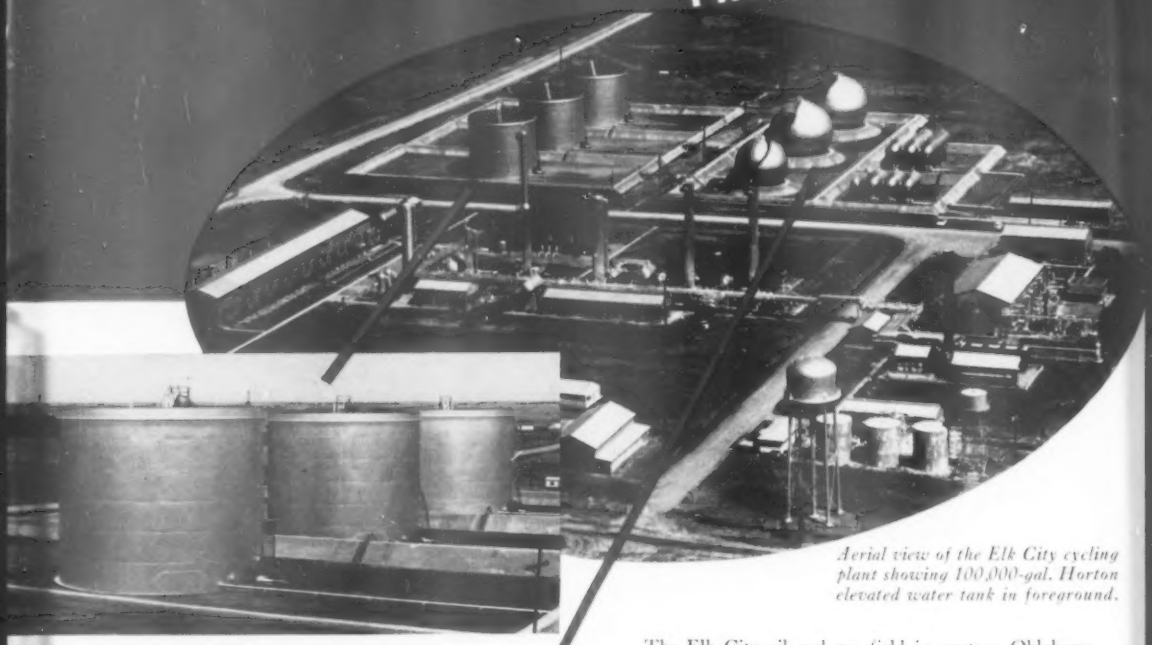
Hughes' high velocity jet rock bits provide:

1. Recognized cutting efficiency of Hughes Tri-Cone and Two-Cone Bits.
2. Flow pattern that assures instant lifting of cuttings off bottom, permitting the bit teeth to act on virgin formation at all times.
3. Jetting turbulence that eliminates balling and keeps cutters clean.
4. Erosion-resistant nozzles positioned to direct high velocity streams on bottom.

You get the benefit of 43 years' experience in building the industry's finest bits when you run a HUGHES Jet Rock Bit.

Information concerning "Hydraulics in Jet Bit Drilling" is available through your local Hughes representative.

ELK CITY Combining Modern Processing and Storage Techniques for More PROFITABLE Operation



Aerial view of the Elk City cycling plant showing 100,000-gal. Horton elevated water tank in foreground.

Above: Three 24,000-bbl. Horton Double-Deck Floating Roof tanks storing crude oil at Elk City.

Two 15,000-bbl. Hortonspheroids 57-ft. 10⅜-in. diam. by 49-ft. 10-in. and one 7,500-bbl. Hortonspheroid 45-ft. 6-in. diam. by 40-ft. at Elk City.

The Elk City oil and gas field in western Oklahoma has been operated as a unit since Jan. 1st, 1951. An operating committee, consisting of one representative for each of the nine operators in the field, designated the Shell Oil Company as Unit Operator. Unitization is expected to increase the ultimate production of the field by 25 per cent.

Production of both oil and gas is delivered by pipe line at 900 lbs. per sq. in. pressure directly to a cycling plant where crude oil, gas and any water in the stream are separated. The crude stream is then flashed at 285 lbs. per sq. in.; heated to 275-300 deg. Fahr.; passed through a stripper; and stored in tanks with Horton Floating Roofs until shipped by pipe line to a refinery.

Wet gas from the separator is processed at 1,100 lbs. per sq. in. in an absorption plant which recovers 225,000 gals. of natural gasoline and butane and 55,000 gals. of propane per day. Four million cu. ft. of dry gas is burned as fuel; 30 million cu. ft. sold to a pipe line; and 75 million cu. ft. returned to the producing sands at 3,800 lbs. per sq. in. pressure.

Helping Elk City obtain maximum efficiency in these operations are three 24,000-bbl. Horton Double-Deck Floating Roof tanks, one 7,500-bbl. and two 15,000-bbl. Hortonspheroids, one 72-in. diam. by 14-ft. gas separator, a 10,000-bbl. flat-bottom water tank and a 100,000-gal. Horton elevated water tank.

Write our nearest office for information or quotations.

CHICAGO BRIDGE & IRON COMPANY

THE OIL AND GAS
JOURNAL
Vol. 51, No. 18

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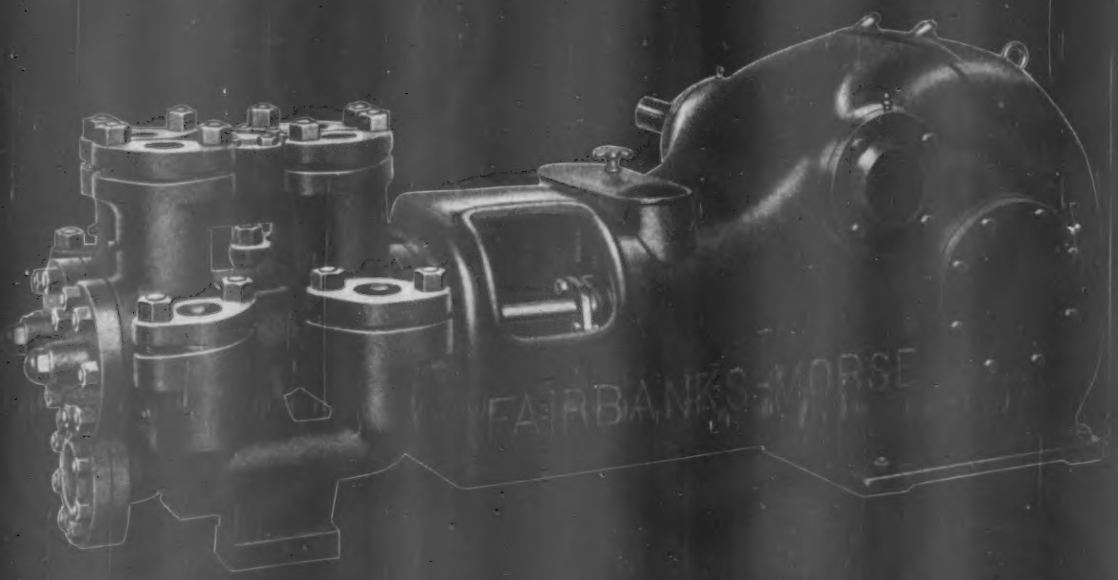
Built Up..

to Oil Field Standards!



Fairbanks-Morse 8-Cover Side-Pot Duplex Power Pumps are built *UP* to the rugged design and conservative standards of oil field pump practice . . . built *UP* to last . . . built *UP* to liberal strength and safety factors.

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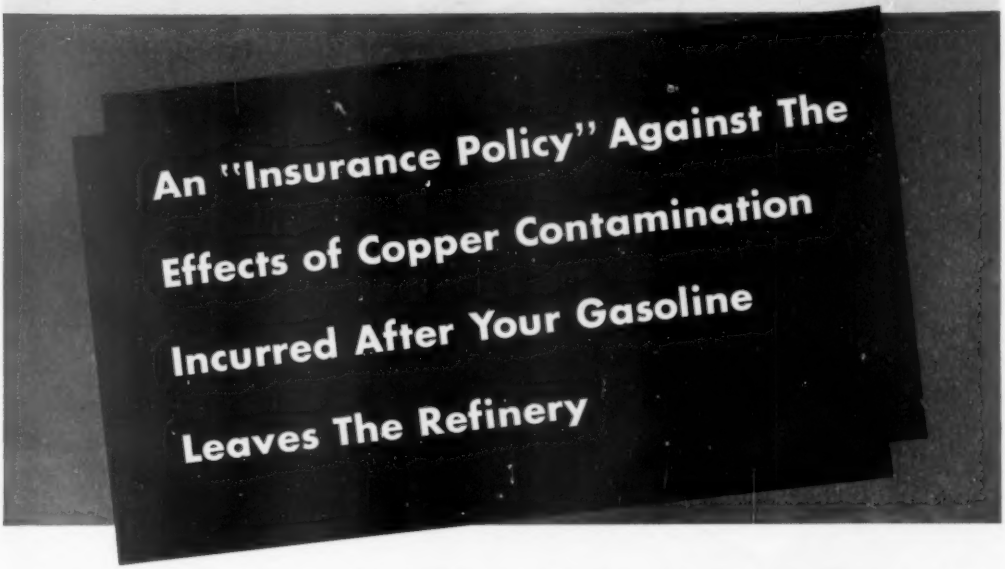

Assume your gasoline leaves the refinery entirely free of copper. Yet, it sometimes ends up at the service station or in a customer's car with traces of copper present. *How* can this be possible?

A careful examination of the distribution system generally uncovers the answer. All of these systems contain valves, pumps and various fittings which may be potential sources of copper contamination.

With consumer interest in gasoline quality running high, at-the-pump quality can be an important competitive factor. And for less than $2 per 1,000 barrels, you can *be sure* your gasoline is free from the effects of copper contamination . . . with Du Pont Metal Deactivator.

DU PONT METAL DEACTIVATOR is specially formulated to offset the harmful effects of copper in gasoline. And when copper is present—from any source—your desired stability can generally be obtained *more economically* with small amounts of Metal Deactivator than with antioxidants alone.

In typical gasolines stored at 110°F., for example, the period required to reach a 10 milligram residue level was only 6-8 weeks when antioxidants alone were used. But with the further addition of 1 lb. of Du Pont Metal Deactivator per 1,000 barrels, the stability period was increased to 28-34 weeks.

To determine the effectiveness of Metal Deactivator combined with Du Pont antioxidants in your own stocks, storage tests—rather than accelerated tests—are recommended. The nearest Du Pont district laboratory will be glad to cooperate with you. You can obtain samples of our products for your own evaluation by contacting your Du Pont Petroleum Chemicals Division representative.

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"We hold these truths to be self-evident,—that all men are created equal; that they are endowed by their Creator with certain inalienable rights; that among these are life, liberty, and the pursuit of happiness."

—Thomas Jefferson (1743-1826)

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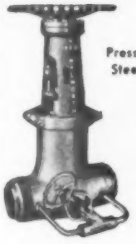

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Small Cast Steel Angle and Y-Globe Valves for high-pressure service

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Knowing that Walworth valves and fittings are a vital part of the power arteries aboard this great ship, the proudest moment of Walworth's 110 years of manufacturing experience came when the new Queen of the Sea broke both the east and west trans-Atlantic speed records.

As we present our compliments to Commodore Manning and his crew, to the Newport News Shipbuilding & Dry Dock Company and its men, and to William F. Gibbs and his staff, we also compliment the men and women of the Walworth Company who gave of themselves to put quality into our products and this quality ship.

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fill...
and
drain

the inside story of TANK PROTECTION

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Wherever corrosion is a problem—in petroleum, chemical or processing industries—coatings formulated with VINYLITE Brand Resins offer the practical, effective solution. Easily applied by dip, brush or spray, coatings based on VINYLITE Resins are odorless, tasteless, non-flammable. Resisting weather, salt water, oils, greases, chemicals, corrosive atmospheres, and impact, they adhere strongly to metal, concrete, and masonry. Containers are protected from their contents, and contents are safe from container contamination. Readily cleaned, their color stays fresh. Maintenance costs are sharply reduced, equipment life is extended.

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For information and a list of representative suppliers, write Dept. MP-68.

Data on "Corogard" coatings courtesy Minnesota Mining & Mfg. Co., 411 Piquette Ave., Detroit 2, Mich.

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For additional information about the "X" Mayari Rod, or any of the other Bethlehem sucker-rod products, get in touch with the nearest Bethlehem distributor or sales office. Or drop a line to us at Bethlehem, Pa.

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new

550 H.P.

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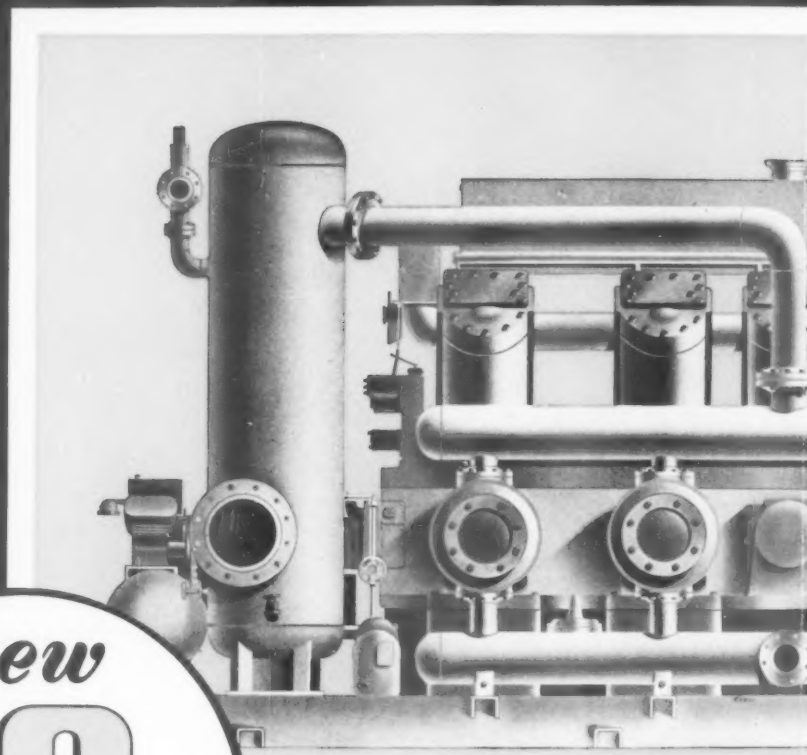
PACKAGED COMPRESSOR PLANT

The J. B. Beaird Company, pioneer developer of the completely packaged—completely assembled packaged compressor plant, now offers a new, more powerful model, the 550 horsepower 10 SVG.

This new addition to the Beaird line makes available to oil and gas producers a range of packaged compressors from 110 to 550 horsepower.

Costs less per horsepower... L



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10

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gas. It has 25% more capacity than the 8 SVG — largest previous Beai
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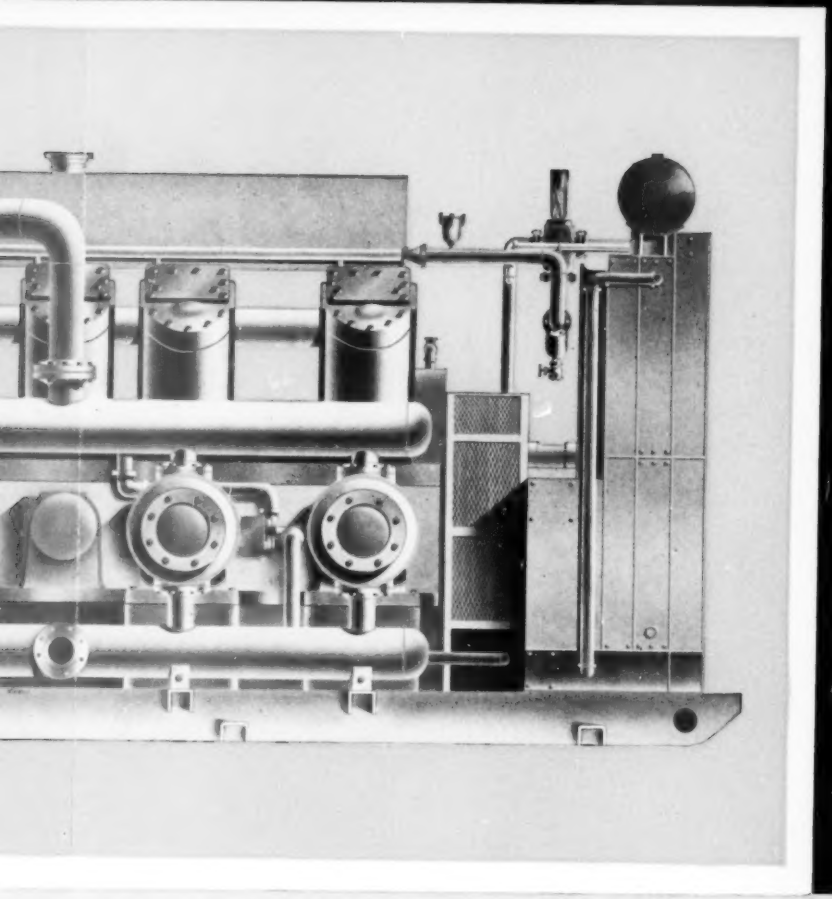

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SIMPLE TO OPERATE
GAS ENGINEERED
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POWER CYLINDER BORE	11¾"	OVER-ALL LENGTH	25'-0"
POWER CYLINDER STROKE	12¾"	OVER-ALL HEIGHT	11'-1"
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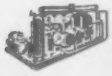
Each packaged compressor plant is individually designed and gas engineered to meet the particular requirements of the service for which it is to be installed.

THE J. B. BEAIRD COMPANY, INC. **SHREVEPORT, LOUISIANA**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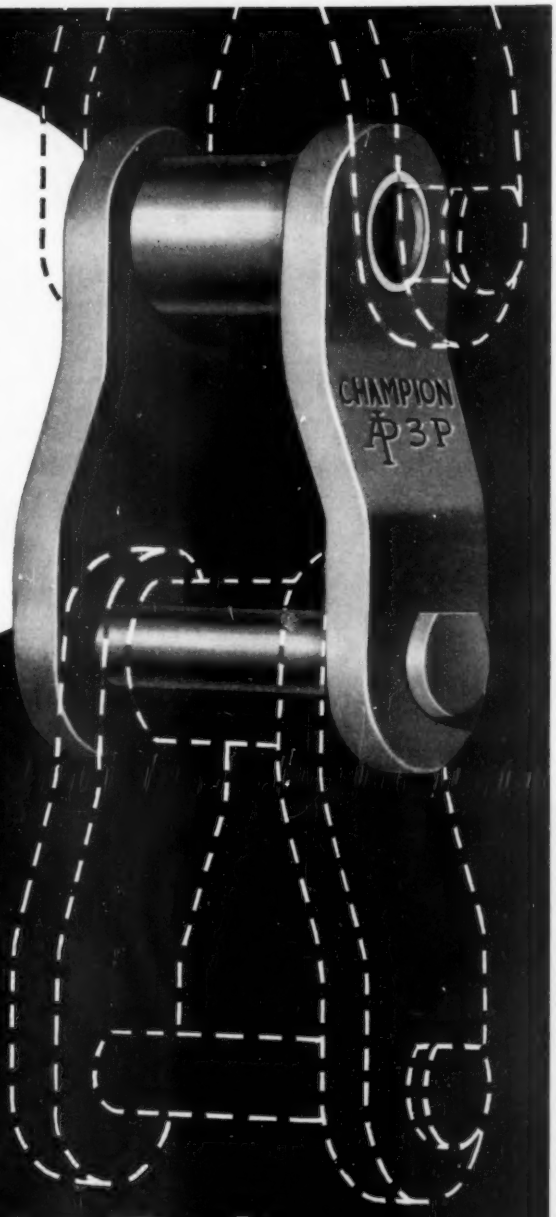

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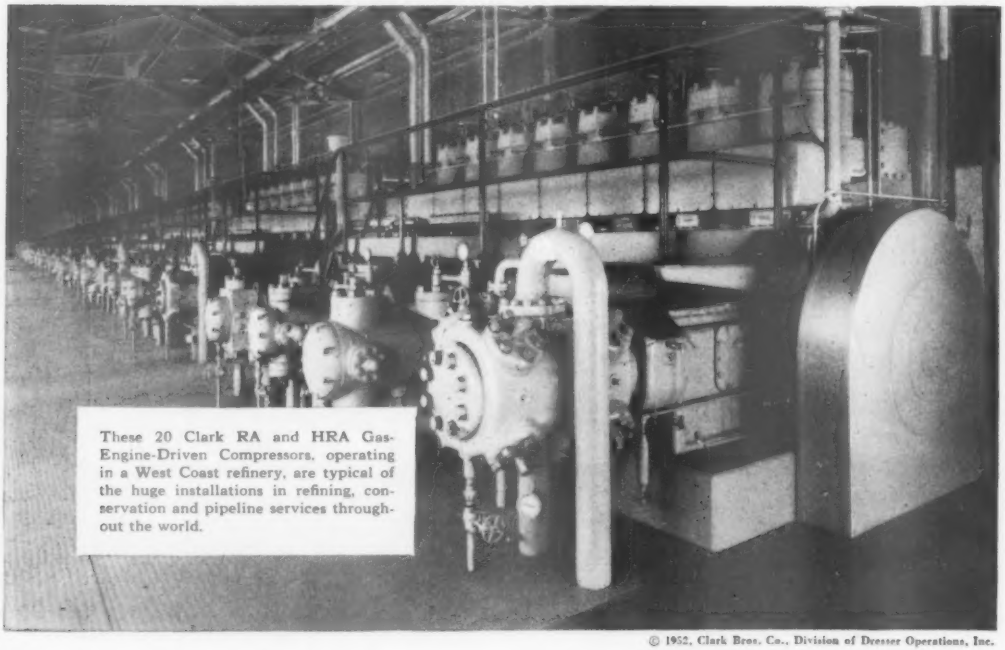

These 20 Clark RA and HRA Gas-Engine-Driven Compressors, operating in a West Coast refinery, are typical of the huge installations in refining, conservation and pipeline services throughout the world.

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Grease Fittings Gun

Save time — Save lubricant, with PORTER Lubricated PLUG VALVES fitted with button head grease fittings.

For quick, convenient and positive lubrication of the valve, PORTER Lubricated PLUG VALVES, in sizes from 6 inches to 24 inches, have Button Head Type Grease Fittings as standard equipment.

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PORTER Lubricated PLUG VALVES are easy to install, easy to open and close, provide positive control, require less maintenance and stay in operation longer.

The operating life of any lubricated plug valve is largely dependent on the quality of the lubricant and the frequency of its use, so PORTER has made it easy and economical to service PORTER lubricated PLUG VALVES.

When ordering PORTER VALVES, be sure to order PORTERLUBE for guns, in drums, 5 gallon cans, or gun size sticks; also Porter Lubricating Gun, 12" hose extension and adjustable Carrying Strap.

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VALVE DIVISION
DRAWER 2650 TULSA 1, OKLAHOMA

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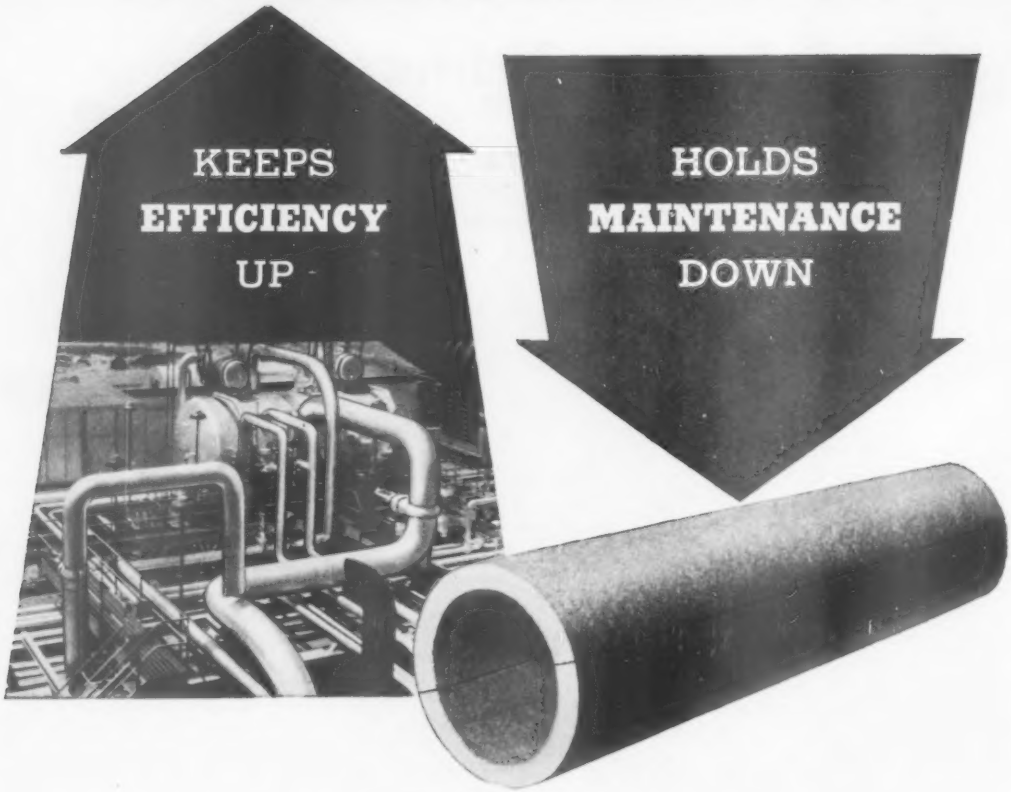

Write for Bulletin No. 76-109, and the name of the Unarco Warehousing Distributor in your area.

Want to reduce heat-loss, surface temperature, and *maintenance costs*—all at the same time? You can, with Unibestos! And you can get stock delivery from your Unarco Distributor in cylinders, half-rounds, or blocks. When temperatures go as high as 1200° F., specify Unibestos No. 1200—and Unibestos No. 750 for up to 750° F., maximum. Or, where temperatures won't run over 600° F., ask for Unarco Amocel—it has many of the same excellent features. Unibestos and Amocel insulations are easy to install, stay put, resist all service hazards.

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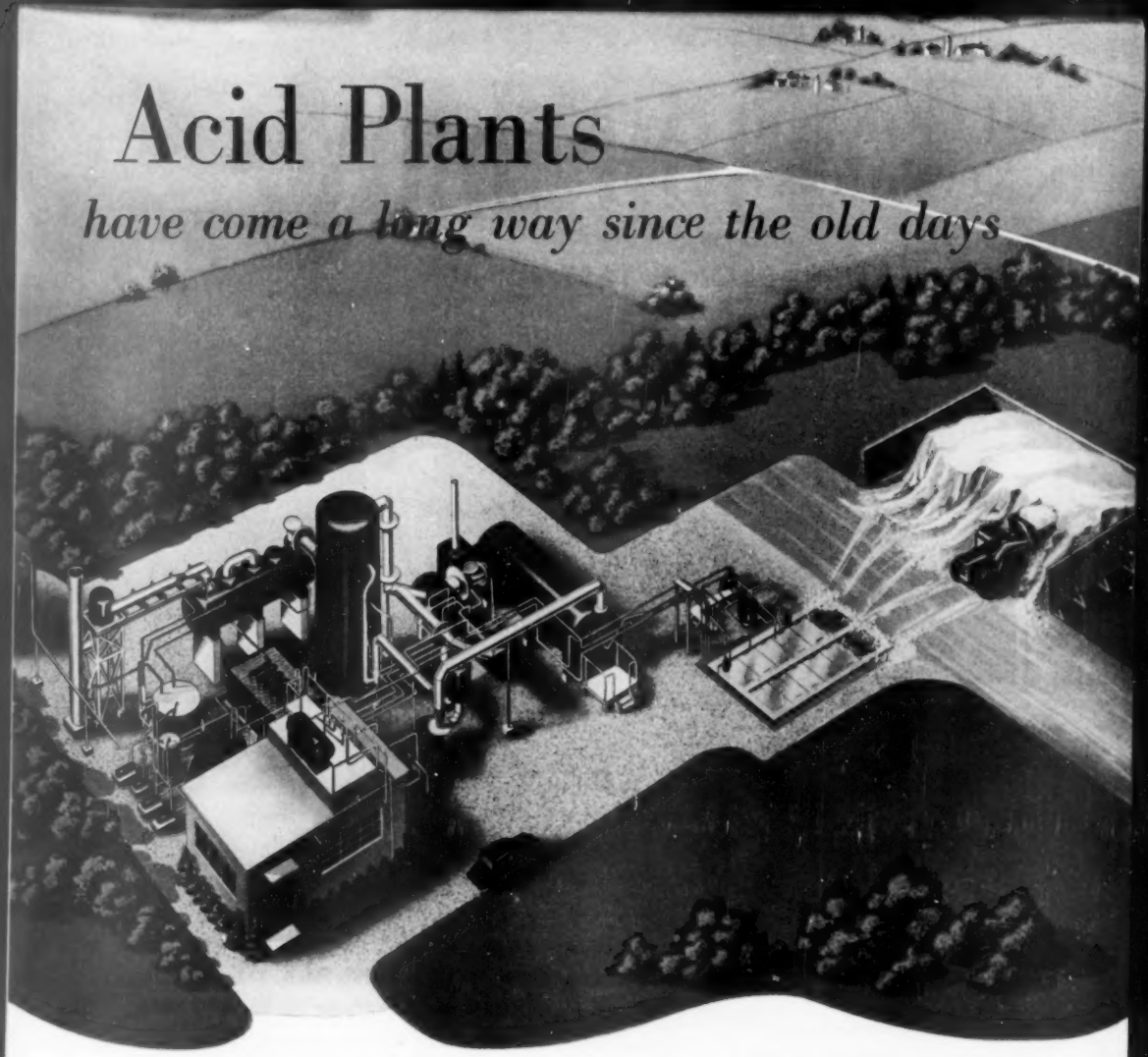
Acid Plants

have come a long way since the old days



At the turn of the century, virtually all sulfuric acid was made by the chamber process. A 50-ton per-day unit was a large installation and chamber acid had a maximum strength of 77 per cent.

Today's contact acid plants are a far cry from the old days. Units are modern and functional in design—efficient and reliable in operation. Single units producing up to 500 tons per day are becoming commonplace and acid of any strength is produced.

Chemico is responsible for many of the developments that account for this vast improvement. Chemico pioneered and pointed the way in the use of—

a. Pre-molten brimstone and spray sulfur burners

b. Pre-dried air for combustion of sulfur

c. Centrifugal blowers and pressure sulfur furnaces

d. Boilers to utilize waste heat of sulfur combustion

e. Economizers to utilize converter heat

f. Highly efficient, non-poisonable vanadium catalyst

g. Quench converters for high catalytic conversion

h. Acid wastes for production of fresh acid

These advances resulted in simpler, more reliable plants—higher efficiency—lower investment—conservation of manpower. Today more than ever, Chemico designed and built plants are profitable investments.

CHEMICAL CONSTRUCTION CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY

488 MADISON AVENUE, NEW YORK 22, N. Y.

TECHNICAL REPRESENTATIVES: CYANAMID PRODUCTS LTD., LONDON • CHEMICAL CONSTRUCTION (INTER-AMERICAN) LTD., TORONTO • SOUTH AFRICA CYANAMID (PTY) LTD., JOHANNESBURG

Chemico plants are profitable investments

CC 839

MILLION JOB KNOW-HOW

MAKES HALLIBURTON'S TEST

One of Many Reasons Why Halliburton's Best for Your Drill Stem Test!

Your Halliburton Tester is a millionaire in know-how. He's inherited the experience of Halliburton's service on more than a million well-jobs. He's highly trained in his specialized skill by five chief testers whose service adds up to a hundred years!

Only Halliburton offers such enormous experience. And only Halliburton has a big research program to develop the benefits of this experience into finer tools and technology. Be sure you get this million-job know-how on your next test. Phone your nearby Halliburton representative. Halliburton Oil Well Cementing Co., Duncan, Okla.

MORE REASONS WHY HALLIBURTON'S BEST:

MOST ADVANCED TOOLS AND TECHNOLOGY

Halliburton's highly specialized tools and exclusive features, its superior knowledge and technique, make misruns a rarity.

YOU GET BENEFITS OF BIG RESEARCH

Halliburton alone offers a testing service developed and improved by 25 years' energetic, grass roots research.

GREATER ACCURACY IN PRESSURE RECORDING

Halliburton's exclusive Bourdon Tube – the most precise pressure recording device – gives you far greater accuracy at no extra cost.

YOU'RE ONLY MINUTES AWAY

Halliburton has 199 field camps in the U.S. and Canada. That puts your Tester only minutes away, ready to go as soon as you call.

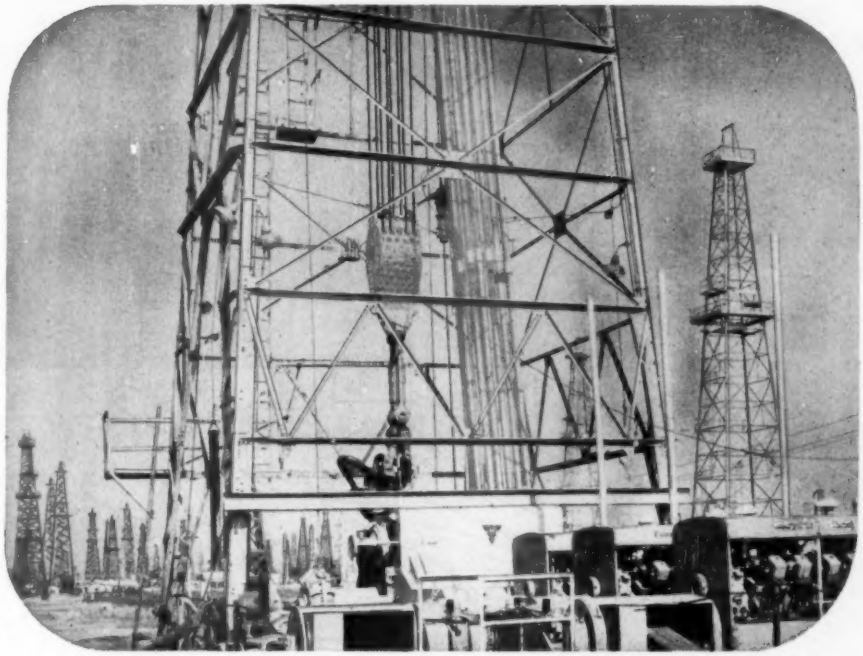
YOU GET REAL PERSONAL SERVICE

Your Tester stays on the rig from start to finish of your test – giving you his full-time attention during this highly important operation.

HALLIBURTON

YEARS AHEAD IN DRILL STEM TESTING!

WIRE ROPE



This is the most economical rope we've ever made for the oil fields

ROEBLING is the best known name in wire rope. That's partly because we were the first wire rope makers in America. But more than that, we've always led in developing better wire and better rope for every purpose.

Today's Roebling Preformed "Blue Center" Steel Wire Rope is the oil man's best choice for efficiency and long life. This rope has *extra* resistance to crushing and abrasion . . . stands up under rough going. It saves you time and cuts costs.

There's a Roebling wire rope of the right specification for top service on any job. Call on your Roebling Field Man for his recommendations . . . District Offices at Cleveland, Denver, Houston, Los Angeles, Odessa and Tulsa. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

DISTRIBUTED BY

THE NATIONAL SUPPLY COMPANY

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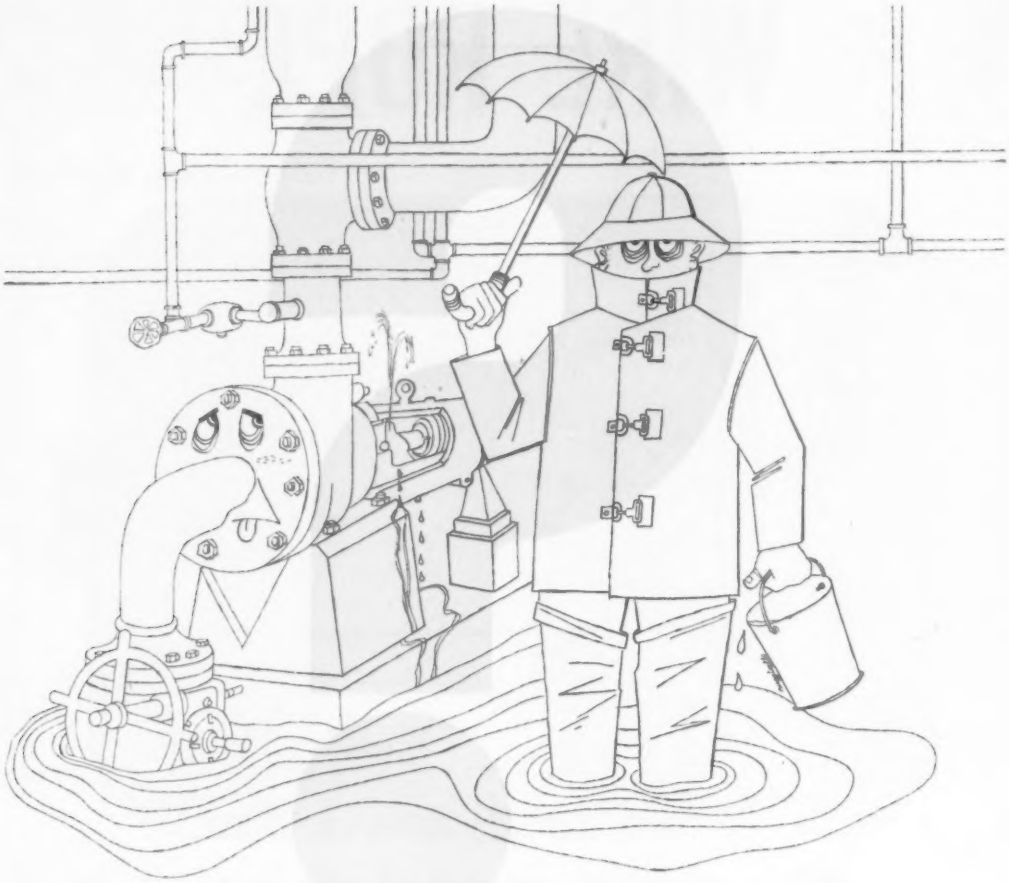


*Who needs a mechanical seal?**

If you've got hip boots, a bucket and a standby maintenance crew with nothing to do, why bother with a BJ Mechanical Seal? Take a devil-may-care, every-pump-for-itself attitude and let the packing fall where it may. Or if your maintenance department enjoys a "Quick-save-the-dikes" sort of life, they will have great fun poking in packing before the stuff completely goes.

BUT . . . if your business allows little room for exciting crises and repacking picnics, you should know about the BJ Mechanical Seal. This excellent, precision-made seal – available in a number of engineered types – takes the trouble right out of any stuffingbox. There's no leakage . . . no waste . . . no contamination of pumped liquid . . . no volatile liquid hazard . . . no profit-robbing repacking and delivery-delaying downtime.

Maybe *you* need a BJ Mechanical Seal for your BJ Pump. Ask your local Byron Jackson office for details or write:

Byron Jackson Co.
Since 1872
P. O. Box 2017, Terminal Annex, Los Angeles 54, California
OFFICES IN PRINCIPAL CITIES

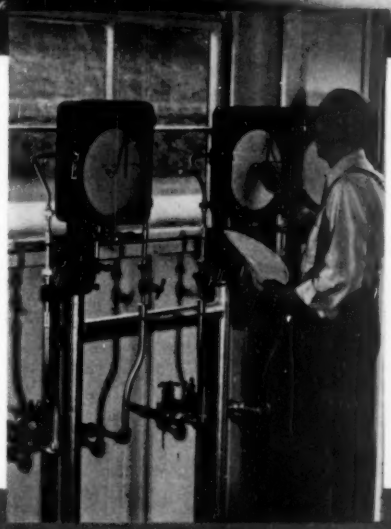
**BJ Mechanical Seals are made exclusively for BJ Pumps.*

SEE BJ FOR THE ENGINEERED ANSWER TO YOUR PUMPING PROBLEMS

ROCKWELL ENGINEERING

Keeps Accuracy High—Service Costs Low!

In Rockwell Orifice meters the original high degree of accuracy can be maintained for years at very low cost. All parts are designed to withstand stresses and strains far in excess of normal expectancy. Stainless steel is liberally used at points subject to corrosive attack. The Teflon packing and stuffing box is self-lubricating, leakproof. Routine adjustments are speeded by the accessible arrangement of interior parts. The entire meter can be dismantled or assembled with common, everyday tools. Investigate the many advantages of this design—its accuracy, convenience and above all its economy in service. Write for bulletin 1050.



THE MOST ACCURATE WAY TO COMPUTE CHARTS . . . *and the most economical*

THE ROCKWELL INTEGRATOR provides the most economical method to compute the extension of orifice meter charts with machine precision. Its use assures that the accurate recording made by the meter will be converted into accurate totals with verified records of results. One Rockwell Integrator computes up to 300 average charts a day. Write for Bulletin 1016.

The Rockwell System of
ORIFICE METERING

Protect the *PAYING PART* of your business . . .

with

Rockwell Meters and Emcorectors and Nordstrom Valves

Install a Rockwell Emcorector on a Rockwell large capacity meter and you have an unbeatable combination for measuring industrial loads at high or intermediate pressures. The Emcorector automatically gives a direct reading of metered volume *corrected to contract base pressure*. It eliminates all chart calculating. You get exact measurement—quick! You get carefully engineered precision in this Rockwell combination, too, plus many economies in service. Write for bulletins.

EASIEST TO SERVICE!

Rockwell meters with their exclusive bowl type bodies and interchangeable valve plate mechanisms are the easiest to inspect, the quickest to service.

ROCKWELL MANUFACTURING COMPANY

PITTSBURGH 8, PA. Atlanta · Boston · Chicago · Houston · Kansas City
Los Angeles · New York · Pittsburgh · San Francisco · Seattle · Tulsa

Meters

TIN

ALUMINUM

CAST IRON

PRESSED STEEL

Regulators

INDUSTRIAL

SERVICE

"1001"

BALANCED VALVE

There's a **ROCKWELL METER & REGULATOR** for every use

FLUOR MUFFLERS and MUFFLER SYSTEMS

with or without air-cooling

For more effective noise abatement, Fluor manufactures a complete line of mufflers ranging from "single element" mufflers to complete muffler systems incorporating a unique "dual element" principle. They are designed to silence 2 and 4-cycle stationary internal combustion engines in the 150 to 3500 H.P. class of virtually every make and model. They meet minimum pressure drop requirements as set by engine manufacturers and are available with or without air-cooled features.

"D" SERIES

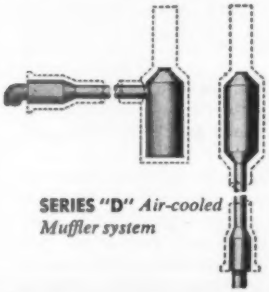
SERIES "D" *Muffler System*
for 2-cycle engines

is a dual element muffling system. Two chambers with interconnecting pipe attenuate noise and pulsation in the immediate proximity of the engine. This system provides the highest muffling efficiency obtainable, greater installation flexibility, and a reduction in the size of exhaust piping ordinarily required.

"C" SERIES

SERIES "C" *Mufflers*

This single element muffler for 4-cycle internal combustion engines is designed on the principle of an acoustical low-pass filter which strips out the audio components of sound waves being transmitted through exhaust gases. Low back pressure is a distinct characteristic of the Series "C"

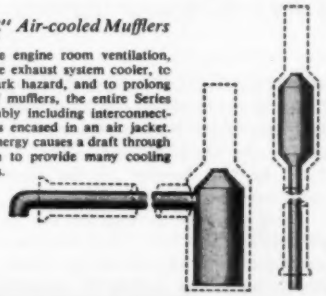


SERIES "D" *Air-cooled Muffler system*

By encasing the muffler system with an air jacket, exhaust energy is utilized to induce the flow of air (via the Venturi principle) which cools the exhaust system, ventilates the engine room and materially lessens spark hazards. Air-cooling also prolongs the life of mufflers by reducing their operating temperature.

SERIES "C" *Air-cooled Mufflers*

To provide engine room ventilation, to keep the exhaust system cooler, to reduce spark hazard, and to prolong the life of mufflers, the entire Series "C" assembly including interconnecting pipe is encased in an air jacket. Exhaust energy causes a draft through the system to provide many cooling advantages.



Shown above are the two types—Series "D" and Series "C", with end inlet and side inlet, with air jackets and without. Fluor also engineers and builds mufflers for special requirements. For complete details write for Bulletin FM-8501.

FLUOR

Engineers - Constructors - Manufacturers

THE FLUOR CORPORATION, LTD. · LOS ANGELES · HOUSTON
New York, Chicago, Pittsburgh, Boston, Tulsa, San Francisco, Birmingham and Calgary

Represented in the Sterling area by:
Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1, England

This blower never takes a "breather"

at THE NATIONAL COOPERATIVE REFINERY ASSOCIATION

There's no time out for this De Laval turbine-driven blower at the McPherson, Kansas fluid catalytic cracking plant of the National Cooperative Refinery Association. Twenty-four hours a day this 21,500 cfm, 2,270 hp unit handles air for regeneration of the spent catalyst.

There are good reasons for this power-saving dependability. This heavy-duty machine is built to take punishment. Its rugged casings, husky, perfectly balanced rotor and externally mounted, cylindrically seated bearings are design features that reduce maintenance and insure continuous operation for long periods of service. And remember, there's no divided responsibility—both turbine and blower are De Laval designed, and De Laval made.

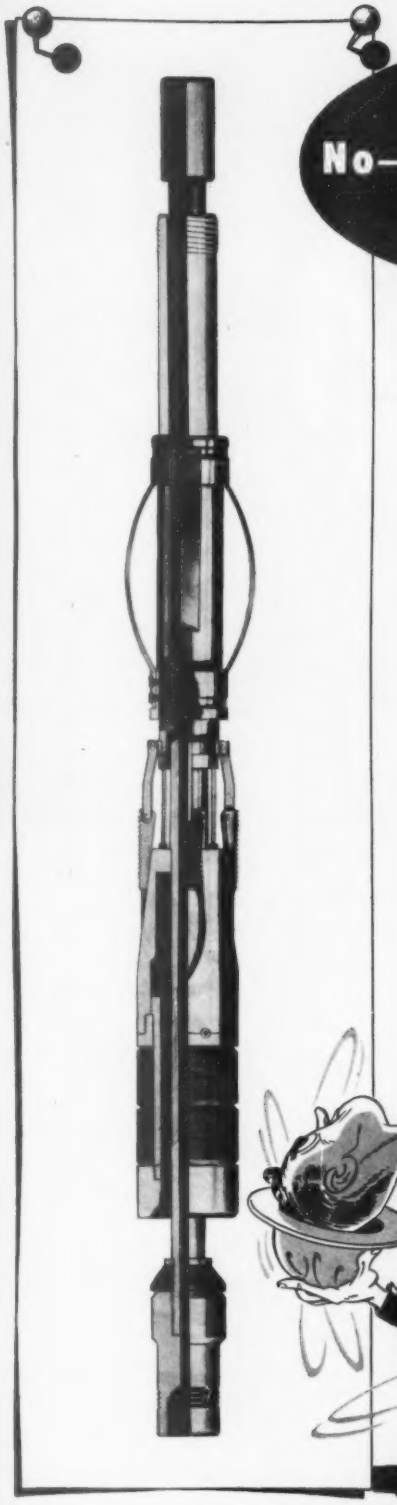
De Laval blower experience covers a wide range of industries — steel, refining, metal mining, chemical processing, high pressure gas transmission, manufactured gas, sewage aeration and many others. And all this engineering and manufacturing experience is ready to solve your specific blower application. Discuss it with a De Laval representative.

DE LAVAL *Centrifugal Blowers*

Send for Bulletin 0500 containing complete data.

DE LAVAL STEAM TURBINE COMPANY
Trenton 2, New Jersey

DL-189



No—the picture's O.K.

This Packer is "Right-Side-Up" when it's "Upside Down"!

LANE WELLS

BOCI

PACKER

handles the jobs where there's great pressure *BELOW* the packer

Such tough jobs as pressure acidizing, formation fracturing, gas injection or water-flooding are just where Lane-Wells BOCI Packer really shines. For this packer sets by *tension*... no need to turnbuckle the tubing, load the annulus above the packer, or use any of the other expensive or unreliable methods of trying to confine great pressures below the packer. The greater the pressure below, the tighter the BOCI packs off! Yet the packer releases easily when the job is done, and comes out without kicking up trouble. Ask any of the hundreds of operators who've used them!

Lane-Wells BOCI Packer is one small part of

Engineered PACKER *Service*

Tomorrow's Tools-Today!

General Offices, Export Offices and Plant • 5610 So. Soto Street, Los Angeles 58, Calif.

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

Your welders will seem like *Siamese Twins*

When they use Midwest Welding Fittings, your welders will turn out so much more work that they'll seem like Siamese Twins. The reason? . . . The exceptional accuracy and uniformity of Midwest Welding Fittings enable your welders to spend more time welding and less time in preparation.

MIDWEST WELDING FITTINGS
IMPROVE PIPING DESIGNS
AND REDUCE COSTS

MIDWEST
PIPING & SUPPLY CO., Inc.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

More Profit from Pumping Wells with COREXIT

Corexit prevents sucker rod and tubing failures that cost you in lost pumping time and production man-hours, as well as the cost of replacing or repairing equipment.

Using plastic coated rods and tubing, Ricker No. A8, McCamey Field, West Texas, had 12 rod breaks during 24 months. Corexit injected. Only 4 rod breaks during next 18 months.

Forms Protective Coating

Corexit gradually builds up a protective coating inside the tubing and on the sucker rods to prevent new corrosion after the compound is injected or batch-dumped into the well annulus. Where corrosion has already started, tests show that Corexit seeks out pits and other corroded spots and coats them to check further corrosion.

Prevents Hydrogen Embrittlement

Many sucker rod failures can be traced to hydrogen embrittlement. On old sucker rods, Corexit coats the corroded spots and prevents the entrance of additional atomic hydrogen. On new sucker rods, Corexit combats hydrogen embrittlement.

Give Corexit a six-month trial, and discover the substantial savings. Write for information.

HUMBLE

HUMBLE OIL & REFINING COMPANY

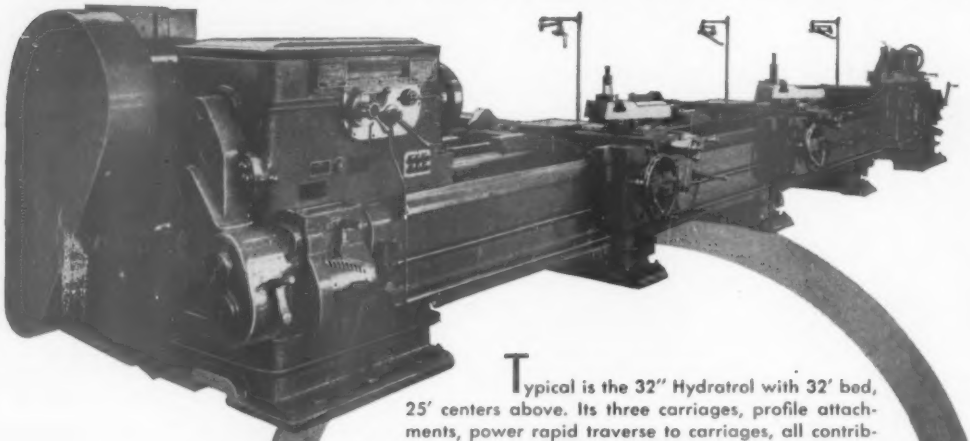
P. O. BOX 2180 HOUSTON, TEXAS

Hydratrol Lathes

Again Helping Uncle Sam to Lower Costs and Increase Production!

LEHMANN'S VERSATILITY OF DESIGN

Machines Gun Tubes Better and Faster



Typical is the 32" Hydratrol with 32' bed, 25' centers above. Its three carriages, profile attachments, power rapid traverse to carriages, all contribute to doing the rough and finish turning of the O. D. on gun tubes better and faster.

CHECK THESE STANDARD FEATURES

- Hydraulically operated speed changes.
- Simplicity in construction, simplicity and safety in operation.
- Automatic Slide Rule indicates spindle speeds, operation numbers, cutting speed.
- Self-compensating hydraulic friction clutches and brakes.
- Speed changes through positive clutches, gears remaining in constant mesh.
- Spindle release for chucking.
- Perfect, safety control lubrication with filtered oil.

Six Sizes

Medium Duty 16"-18"
Heavy Duty 20"-25"
Heavy Duty 32"-36"
Heavy Duty 40"-50"

Lehmann
MACHINE COMPANY

CHOUTEAU AT GRAND • ST. LOUIS 3, MO.

all one piece ...*finned tube*

The fins are extruded from the tube itself

These two views show the construction of Wolverine Trufin* — the integral finned tube. The large drawing illustrates how the fins are formed from the wall of the tube and remain a part of it. Thus, Trufin's efficiency is unaffected by vibration or sudden temperature changes. This finned tube can be fabricated as easily as plain tube. Trufin has an outside surface area many times that of plain tube and points the way to greatly increased efficiency. In addition Trufin can often help you reduce unit size, installation and maintenance time, thus lowering your costs. Find out about Trufin, the integral finned tube, and its relation to your own heat transfer application. Available in a variety of sizes, fin spacings and alloys. Send for your copy of the new brochure, Wolverine Fabricated Parts.

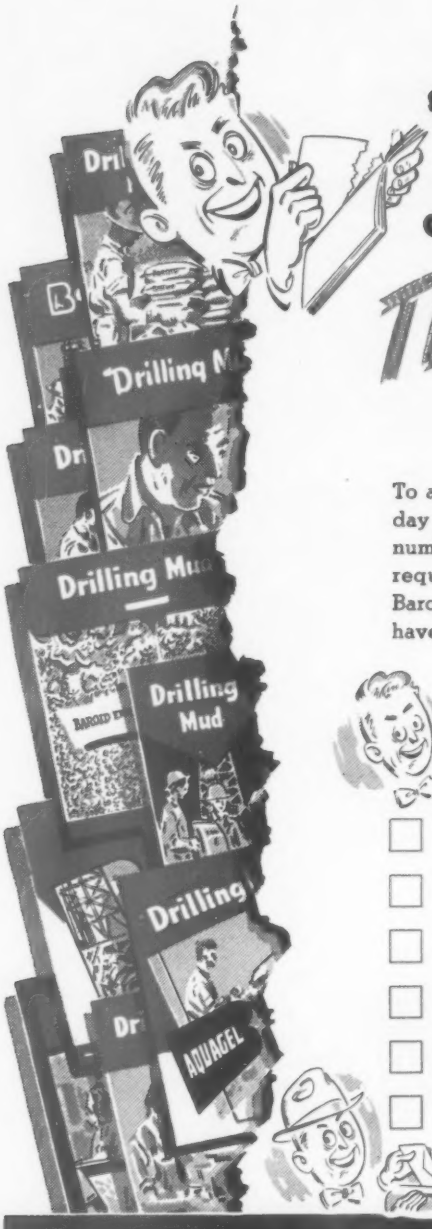
*Reg. U.S. Pat. Off.

WOLVERINE TUBE DIVISION
Calumet and Hecla Consolidated Copper Company
Incorporated
Manufacturers of tubing exclusively
1459 CENTRAL AVENUE • DETROIT 9, MICHIGAN

Plants in Detroit, Michigan and Decatur, Alabama; Sales Offices in Principal Cities

Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Unifin Tube Co., London, Ontario.

Export Department, 13 E. 40th St., New York City 16, N. Y.



for accurate, detailed information on common drilling mud problems

TEAR OUT THIS PAGE!

(and mail it in, of course!)

To aid drillers and field engineers in meeting everyday drilling mud problems, Baroid has prepared a number of authoritative bulletins which are free upon request. Much of this information, developed by Baroid, is available nowhere else, and men in the field have testified to the outstanding value of this material.

Check the subject in which you're interested!

- ☐ Uses of organic colloid (IMPERMEX) muds.
- ☐ Determining filter loss and filter cake.
- ☐ Lost circulation.
- ☐ Weighted muds.
- ☐ Field tests of drilling muds.
- ☐ Mud thinners.
- ☐ Well logging thru mud-and-cuttings analyses.
- ☐ Overcoming anhydrite and gypsum contamination.
- ☐ AQUAGEL (Bentonite) in drilling muds.
- ☐ Oil-emulsion drilling mud.
- ☐ Baroid Catalog.

Mail to: **BAROID SALES DIVISION**
P. O. BOX 1675 • HOUSTON 1, TEXAS

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BAROID SALES DIVISION
NATIONAL LEAD COMPANY
Main Office: Houston, Texas
HOUSTON : TULSA : LOS ANGELES

Coated and wrapped—ready for long service

Best barrier against corrosion...

BITUMASTIC® ENAMEL

Bitumastic Enamel being machine-applied

● If you keep moisture away from pipe-line surfaces with a protective coating, you prevent corrosion. But there's one point to bear in mind: *ordinary* protective coatings just can't keep out moisture, year after year.

But Bitumastic Enamels can—*because they're far from ordinary.*

First, these durable enamels are processed from a base of selected coal-tar pitches, *making them impervious to moisture.* Further, they make a tight bond with the pipe, and don't disintegrate with age. And they are capable of applications in one coat to a substantial thickness of approximately 3/32 of an inch. Finally, they are chemically resistant to soil elements, and maintain continuously high electrical resistance.

Through the years, these qualities have proved themselves. Many oil and gas pipe lines, protected by Bitumastic Enamels in the '20's, are still giving good service today.

Specify Bitumastic Enamels and give your pipe lines the same effective protection against corrosion. Your Koppers representative will give you complete details and estimates.

Bitumastic Enamels soon available from Koppers new California Plant!

As soon as present construction work is completed, Koppers will be able to supply Bitumastic Enamels from a new plant at Fontana, California. The plant is being built to give you better service in the West.

KOPPERS BITUMASTIC ENAMELS

REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, 903T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

A girdle 'round the globe

The total length of G-R Finned Tubing that has been furnished for heaters, coolers, condensers and heat exchangers would circle the world.

More than 70,000 Twin G-Fin Sections . . . just one of the many types of G-R Finned Tube Units . . . have been installed, serving the broadest range of applications of any heat transfer apparatus on the market. Many thousands of K-Fin Air and Gas Coolers have been built for stationary plants and shipboard. For more than 30 years, G-R Finned Tubing of various designs has been widely used for heat transfer apparatus ranging from tubular units to open sections.

Thus, each design of G-R Finned Tubing has given complete proof of its effectiveness and also its durability. Investigate the applications of these time-proven heat transfer elements for *your* plant, particularly for handling viscous liquids and gases. Write for bulletin describing their features and uses, and the types of exchangers for which they can be furnished.

G-R G-Fin Longitudinally-finned Tubing . . . specially adapted to transfer of heat to and from liquids of higher viscosity than water.

G-R K-Fin Helically-finned Tubing . . . specially adapted to transfer of heat to and from vapors and gases.

THE GRISCOM-RUSSELL CO., MASSILLON, OHIO

G-R HEAT TRANSFER APPARATUS *Finned Tubing*

GR 293

Santolube 70, a new development by Monsanto Research, solves the problem of rust on ferrous metal parts of turbines and other equipment employing oil in closed systems.

Santolube 70 is effective in concentrations ranging from 0.02% to 0.10%. The lower dosage usually is ample protection in light turbine oils. For more viscous oils and where salt water is present, higher concentrations of the additive are recommended.

The new additive has been tested thoroughly, with results proving its efficiency beyond normal operating requirements.

If rusting is a problem with your industrial oils, it will be worth your while to get the details on Monsanto Santolube 70. Write for a copy of the new Monsanto Technical Bulletin No. O-86, which gives test results, typical inspection values and much other useful information. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

Santolube: Reg. U. S. Pat. Off.

SANTOLUBE 70

MONSANTO
CHEMICALS – PLASTICS

Serving Industry... Which Serves Mankind

When Butane says "HANDLE WITH CARE"

CHIKSAN ADDS SAFETY and SPEED TO LOADING OF TANK CAR AND TRUCK

With counterbalanced Chiksan loading racks, one man can quickly and easily make connections to tank cars.

CHIKSAN low pressure swivel joints employed here on both supply and return lines insure safety, speed and economy in loading tank cars.

A typical near ground level truck loading rack using CHIKSAN joints on supply and return lines.

Close up of CHIKSAN low pressure joints on supply and return lines in truck loading of Butane.

It takes speed, safety and kid-glove handling to keep up the massive flow of liquefied petroleum gas at Standard Oil Company of California's El Segundo plant.

Chiksan provides the necessary liquid-tight, gas-tight unions, the characteristic flexibility of motion to keep the touchy Butane flowing at a swift, even pace with safety to workers, plant and community — with profit to the company.

No less than eight Chiksan Ball-Bearing Swivel Joints are needed for each loading installation to keep the gas moving into tank and truck—to provide the essential carry-off of the highly explosive vapors. And with Chiksan on the job, metal of relative low porosity takes the place of more porous and less safe rubber.

Standard Oil Company of California's El Segundo installations are typical of industry's reliance on Chiksan Ball-Bearing Swivel Joints around the world to speed the flow of enterprise — to promote production and defense—to increase safety—to protect profits.

Wherever liquid or gas must flow in industry — wherever hydraulic systems can add efficiency and economy—Chiksan Ball-Bearing Swivel Joints are on the job. If more flexibility—greater stamina—longer life and added economy are of interest to you, Chiksan's Research and Development Division can help you find a better, swifter way.

The Flow of Enterprise Relies on **CHIKSAN** *Ball-Bearing Swivel Joints*

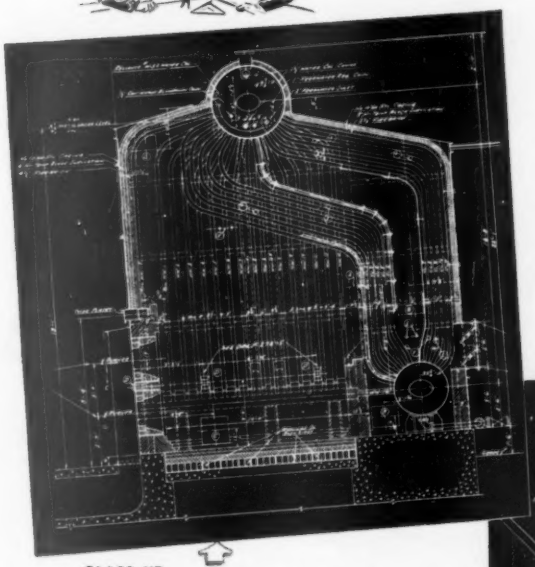
Representatives in Principal Cities Write for Catalog 51-C. Dept. 9-OGJ

CHIKSAN COMPANY • BREA, CALIFORNIA • Chicago 28, Illinois • Newark 2, New Jersey

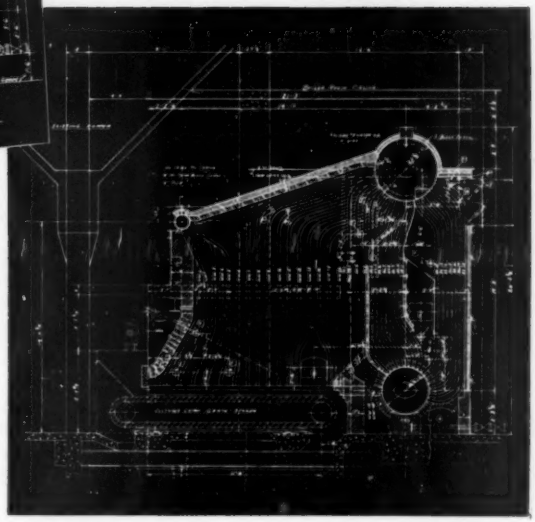
Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Chiksan Export Company (Subsidiary), Brea, California; Newark 2, N. J.

Industry Approved

Two-Drum STEAM GENERATORS by Vogt



CLASS VF
A 22,000 pounds steam per hour unit installed at Indiana Farm Bureau Refinery, Mt. Vernon, Ind.



CLASS VS
The Seelbach Hotel, Louisville, Ky. is served by this 30,000 pounds steam per hour boiler.

A wide variety of industrial plants and other users of steam for power, processing, or heating have found these efficient Vogt Two-Drum Type Boilers to be the answer to their diverse steam generating requirements.

Class VF units provide maximum capacity in limited floor space and head room, while Class VS is best adapted to installations not having such restrictions. Each has a large furnace volume and a high ratio of radiant heating surface. The furnace design assures proper combustion of fuels fired in suspension or with various type of stokers.

A bulletin with general information and showing typical installations is available on request.

Typical Users...

FOOD PROCESSING PLANTS

DISTILLERIES • HOTELS

HOSPITALS • CHEMICAL PLANTS

PETROLEUM REFINERIES

HENRY VOGT MACHINE CO., Louisville 10, Kentucky

BRANCH OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO, ST. LOUIS, DALLAS, CHARLESTON, W. VA.

Whether you want one worm-gear speed reducer or a thousand, a standard drive or a specially designed unit, Cleveland can serve you to your complete satisfaction.

Performance measures value in a Cleveland

FOR over forty years, Cleveland has concentrated on the manufacture of worm-gear drives.

In specializing on a single type of gearing, this Company has emphasized one value above others—dependability—measured by the yardstick of performance on the equipment of its customers.

Thousands of worm-gear drives, made in the earliest years of the Company's operations, are in service today. They do not wear out. They serve in every phase of American industry, drive every type of mechanical equipment where a powerful, trouble-free, right-angle drive is wanted.

For a full showing of the wide variety of sizes and capacities of Cleveland worm-gear drives available, write for new Catalog 201F. The Cleveland Worm and Gear Co., 3286 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

a pressure controller

that's tough...
versatile...
dependable

the new HONEYWELL PRESSURE PILOT

Complete with every feature you need

SET POINT

Differential screw permits accurate adjustment of set point; no gears or other cumbersome devices.

OVERLOAD PROTECTION

Unique over-pressure safeguard prevents damage to control mechanism.

REVERSAL OF ACTION

Control can be changed from direct acting to reverse in just 30 seconds, by a single adjustment. No pressure connections need be broken.

UNIVERSAL MOUNTING

Light, compact case can be mounted wherever convenient: on valve yoke, wall, panel front, or flush in panel.

PROPORTIONAL BAND

Readily adjustable from 1 to 100%, on a clearly graduated scale.

UNIT CONSTRUCTION

Simplified design speeds cleaning, repair or replacement of sub-assemblies.

A PRESSURE controller of unusual ruggedness and versatility, the Honeywell Pressure Pilot is an ideal means of regulating hydraulic systems, pipe lines, pump outlets and other applications where more expensive indicating and recording instruments are not warranted.

It utilizes a Bourdon tube sensing element, flapper-and-nozzle control assembly, and a pneumatic booster relay . . . all combined in a sturdy, low-cost unit capable of remarkably accurate control.

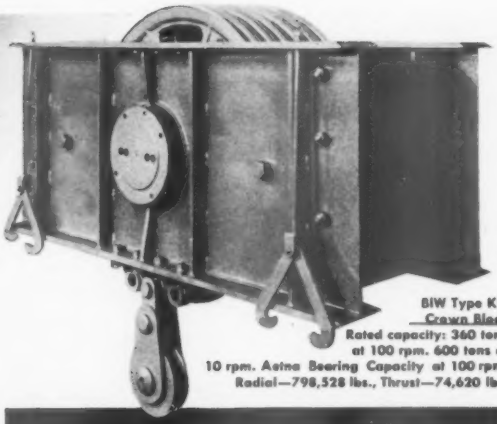
See the Pressure Pilot at first hand, right in your own plant. Our local engineering representative will be glad to demonstrate it; just call him today . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 1906 Windrim Ave., Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**
VALVE PRODUCTS
First in Controls

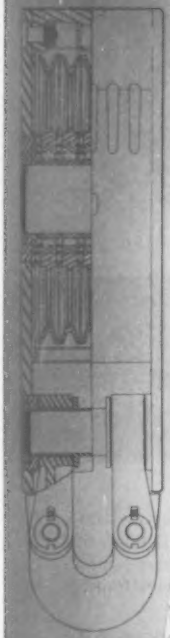
● *Important Reference Data*
Write for New Bulletin 16-1, "Honeywell Pressure Pilot."

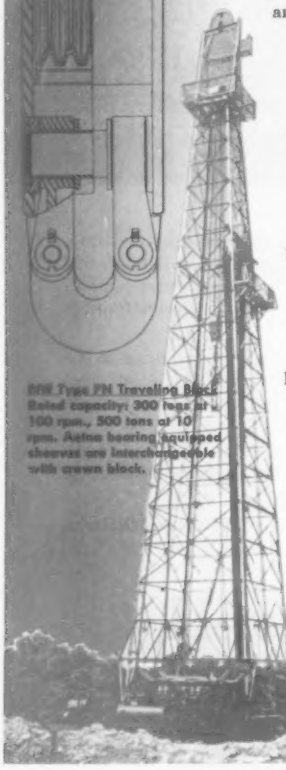
BIW Blocks
TEAMED WITH
Aetna
BEARINGS...



BIW Type KN Crown Block
Rated capacity: 360 tons at 100 rpm. 600 tons at 10 rpm. Aetna Bearing Capacity at 100 rpm. Radial—798,528 lbs., Thrust—74,620 lbs.

ANOTHER EXAMPLE OF HOW AETNA COOPERATIVE ENGINEERING PAYS OFF



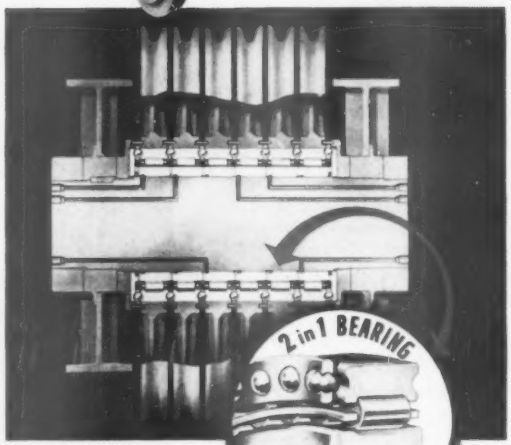


BIW Type FN Traveling Block
Rated capacity: 300 tons at 100 rpm., 500 tons at 10 rpm. Aetna bearing equipped sheaves are interchangeable with crown block.

Compact, streamlined, weight-saving design and vastly superior functional utility—both are achieved in these Beaumont Crown and traveling blocks as a direct result of the patented Aetna 2-way bearing illustrated.

Combining, as it does, both cylindrical rollers and balls, this unique bearing handles both radial and thrust loads as pure, right angle, non-interfering loads. This revolutionary design attains the lowest possible coefficient of friction, increases radial load capacity, lengthens bearing life, reduces risk of down-time, cuts block maintenance and bearing replacement costs to a new record low.

In the development of these better crown and traveling blocks, the experience of Beaumont Iron Works Company has been typical of other manufacturers the country over. They've found it pays . . . handsomely . . . to work with Aetna. Very possibly, you too, can improve your product and save money—with the help of Aetna engineering teamwork. Why not try it and see . . . on a confidential, no-obligation basis? Aetna Ball and Roller Bearing Company, 4600 Schubert Ave., Chicago 39, Illinois.

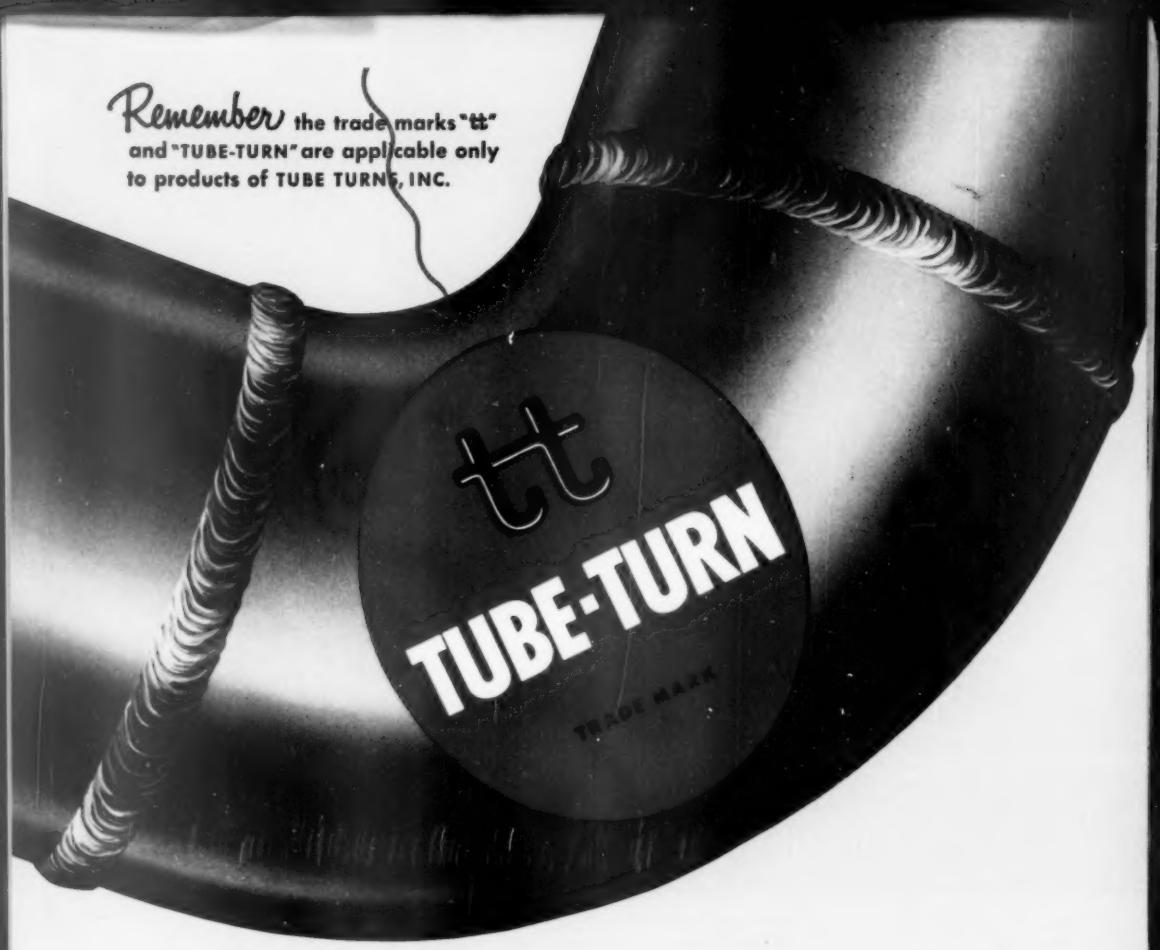


A BALL BEARING FOR THRUST LOADS
A ROLLER BEARING FOR RADIAL LOADS

This efficient, compact design reduces width and weight, yet increases strength and durability of crown and traveling blocks—is adaptable to blocks with any number of sheaves.

Standard and Special Ball Thrust Bearings • Angular Contact Ball Bearings • Special Roller Bearings • Ball Retainers • Hardened and Ground Washers • Sleeves • Bushings

Remember the trade marks "tt" and "TUBE-TURN" are applicable only to products of TUBE TURNS, INC.



Engineered to save maintenance manhours

Scrappy says, "Aid defense—more scrap today... more steel tomorrow."

Write Dept. J-9 for free booklet giving Dimensional Data on types, sizes and materials of TUBE-TURN Welding Fittings and Flanges.

THIS TUBE-TURN WELDING ELBOW is engineered for shape, size, dimension, and wall thickness . . . to provide you with permanent, leakproof piping. It is forged by the only process that produces a wall as uniform in thickness and true in circularity as the original seamless pipe . . . guaranteeing accurate fit-up and *full strength throughout.*

More than ever, any piping installation you make should be maintenance-free, and have extra long life . . . that's why it pays to *specify* TUBE-TURN Welding Fittings and Flanges. For good service call on your nearby TUBE TURNS' Distributor . . . you'll find one in every principal city.

Be sure you see the double "tt"

TUBE TURNS, INC. LOUISVILLE 1, KENTUCKY

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Chicago • Houston • Tulsa • San Francisco • Los Angeles

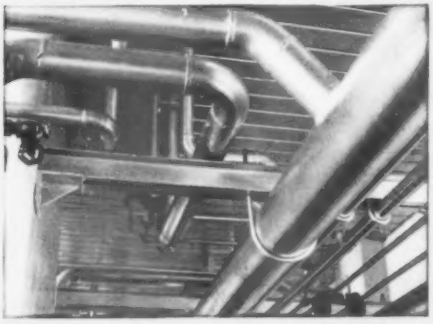
TUBE TURNS OF CANADA LIMITED, CHATHAM, ONTARIO... A wholly owned subsidiary of TUBE TURNS, INC.

Reliable welded piping handles a billion cubic feet of gas per day

Round-the-clock dependability is a major requirement of piping for the compressor stations of Tennessee Gas Transmission Company, serving pipeline facilities from Southwest Texas to Northeastern United States. Piping at the Fostoria, Texas station handles more than a billion cubic feet per day. It is essentially all welded, uses TUBE-TURN Welding Fittings and Flanges. Forged-in strength of TUBE-TURN Welding Fittings assures dependable, leakproof service.

Piping in metering house uses several types of welding fittings . . . welding caps, reducers, saddles, flanges, etc. With TUBE-TURN Welding Fittings and Flanges, all necessary components can be obtained from one reliable source, streamlining ordering and deliveries.

Piping to gas scrubbers was fabricated swiftly. Careful engineering and dimensional accuracy of TUBE-TURN Welding Fittings assures perfect alignment, helps welder get top quality joints.



Water and oil lines in compressor plant range from 1" to 12" sizes. Directional changes are accomplished smoothly and easily with TUBE-TURN Welding Fittings. Flow resistance and pressure loss are kept to a minimum.

TUBE TURNS, INC., Dept. J-9
224 East Broadway, Louisville 1, Kentucky

Your Name .....
Position .....
Company .....
Nature of Business .....
Address .....
City ..... *State* .....

DISTRICT OFFICES

New York	Houston
Philadelphia	Tulsa
Pittsburgh	San Francisco
Chicago	Los Angeles

"tt" and "TUBE-TURN" Reg. U. S. Pat. Off.

TUBE TURNS, INC.
LOUISVILLE 1, KENTUCKY

G-E CIVIL DEFENSE FILM AWARDED FREEDOMS FOUNDATION PUBLIC SERVICE MEDAL

Outstanding public service release currently available for civic and industrial showings

MORE than 10 million people have seen General Electric's civil defense film showing how a city prepares its communications network for vital disaster service. A dramatic documentary, the 22-minute motion picture stresses the role of communications in everyday life, depicts an atomic blast over Syracuse, N. Y. and demonstrates how the existing communication systems of a city and a county can be coordinated in an emergency. The film is a part of the nation-wide Communications Advisory Service, a G-E organization of electronics engineers whose consultation services are available to communities and industries of every size.

One of the most popular films in G-E history, "Voice" is being sponsored by civic and industrial groups across the nation to stimulate public interest in civil defense. If you want it for your community at only nominal cost for mailing, call the CAS* man at the G-E office near you, or write us. *General Electric Company, Section 892-8, Electronics Park, Syracuse, New York.*

**Communications Advisory Service*

Freedoms Foundation president Kenneth D. Wells, presents award scroll to Roy D. Jordan (center), secretary of G.E.'s Electronics Division CD Committee, and Neal F. Harmon, G.E.'s CD Coordinator.

The film shows evacuation of residents from the city by taxicab after the atom "blast" plus many other eye-opening scenes. Will your city be prepared? Be sure to see this timely civil defense film.

Lt. General Willis Crittenberger, commanding First Army, with G.E. Vice-President W. R. G. Baker on nationwide TV showing of film. More than 30 TV stations have screened the picture as a public service.

GENERAL ELECTRIC

Advancing Across Alabama . . . .

another Republic Electric Fusion Welded Pipe Line

Here you see a section of natural gas pipe line going in the ditch fast near Leeds, Alabama. This line is made of Republic 24-inch Electric Fusion Welded Pipe.

This big pipe goes together fast because its circumference always is constant, and its wall thickness always is uniform . . . with an even distribution of metal all around the pipe. Field joints line up accurately and quickly. The entire circumference can be welded at top speed.

This rugged pipe is electric fusion welded *inside and out.* Then, it's hydraulically expanded to uniform size, straightness and circumference . . . to increase its high yield strength for safer pressure handling.

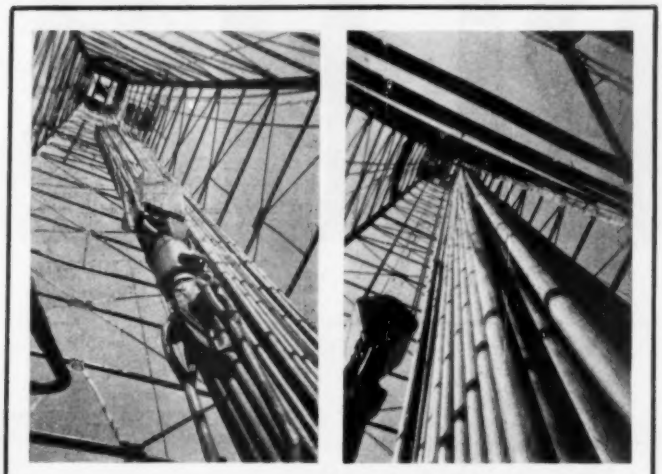
All facilities of Republic's integrated mill at Gadsden, Alabama, are devoted to production of expanded Electric Fusion Welded Line Pipe in sizes 24-inch through 30-inch O.D.—and to keeping the big pipe moving out to its big jobs.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic
REPUBLIC STEEL
ELECTRIC FUSION WELDED LINE PIPE

Other Republic Products include Upson Bolts, Studs, Nuts and Rivets—Pipe—Sheets—Plates—Electrunite Heat Exchanger Tubes

Toolpushers' Favorites--



A man's selection of drill pipe and wire rope, essentially companion products, earmark his taste and judgment. A man likes to drill a well with good equipment, for the same reasons he likes to drive a good car and own a nice home.

J&L DRILL PIPE. For meeting the requirements of modern drilling, many Toolpushers are convinced that J&L Integral Joint Seamless is unsurpassed. Made of Blue Ribbon Steel in Full Hole and Internal Flush Design.

J&L WIRE ROPE. While wire rope is "just a maintenance item", it costs the industry around a hundred thousand dollars every day! For the toughest drilling line that runs down to a drum, countless Toolpushers put their money on J&L Wire Rope to win.

For really interesting, pertinent facts about Drill-Pipe and Wire-Rope performance in your area, ask any Jones & Laughlin Supply man or write us at Tulsa.

J&L STEEL

J&L STEEL

AMERICA NEEDS SCRAP TO MAKE MORE STEEL

Jones & Laughlin Supply Company

EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.
88 STORES • 19 OFFICES • 9 RESIDENT SALESMEN
General Offices: TULSA, OKLAHOMA

J&L STEEL

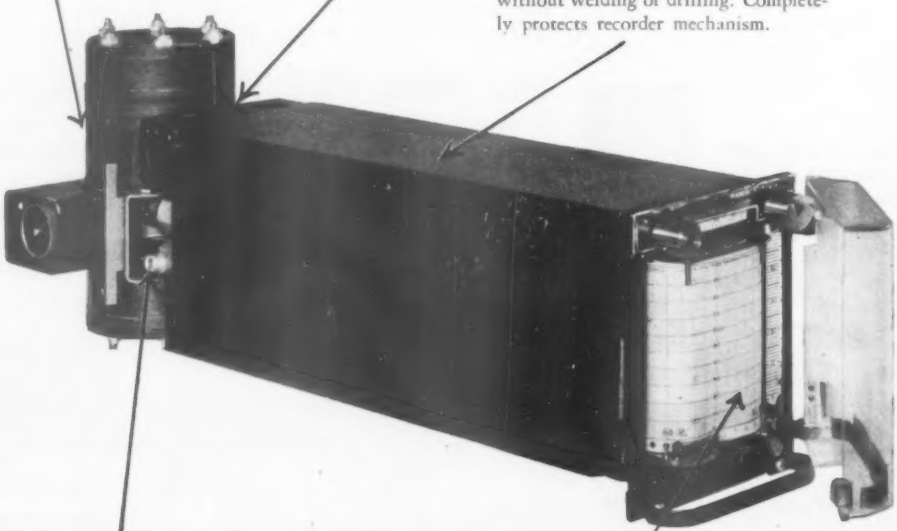
Subsidiary of Jones & Laughlin Steel Corporation

PLUG IN

The plug-in controllers can be removed and replaced with another unit in just 10 seconds.

One common, self-sealing manifold gives plug-in connections to both receivers and controllers!

Rugged steel sleeve clamps on panel, without welding or drilling. Completely protects recorder mechanism.



The only piping on the panel back are lines from the transmitter, air supply and controller output. Units can be mounted just a few inches apart.

Recorder or indicator plugs in from the front—units can be interchanged in just 10 seconds.

THE NEW IDEA IN PANEL INSTRUMENTATION

Taylor, pioneer in the 3-part control system brings many new refinements based on extensive field experience

1. Change from simplest to most complex control by simply pulling out one unit, plugging in another.

2. Change from indicator to recorder or vice versa in only 10 seconds.

3. One mounting for both controller and receiver—recorder or indicator.

4. Recorders or indicators can be mounted on the panel without welding, without drilling holes.

5. Only piping connections required are air supply, controller output, and to variable transmitter. All other connections made automatically in self-sealing manifold.

6. All adjustments can be reached without disturbing any connections.

7. Mountings are extremely simple and rugged.

8. You save panel space by mounting units a few inches apart.

9. Receiver mechanism totally enclosed by protective sleeve.

10. You save money on installation—thanks to simplified piping and mounting.

Be sure to get information on the new and greater plug-in type Taylor TRANSET Control before you make any decision involving pneumatic transmission control. Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.

▼ ▼ ▼

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

® Reg. U. S. Pat. Off.

ADDITIONAL NEW FEATURES IN TAYLOR'S TRANSET® RECORDER:

Continuous valve position indication on separate scale tells valve pressure at a glance.

Chart read back device gives easy access to past records without disturbing any function of the recorder or interrupting the record.

New chart drive mechanism for greater convenience, greater dependability.

Taylor Instruments

MEAN

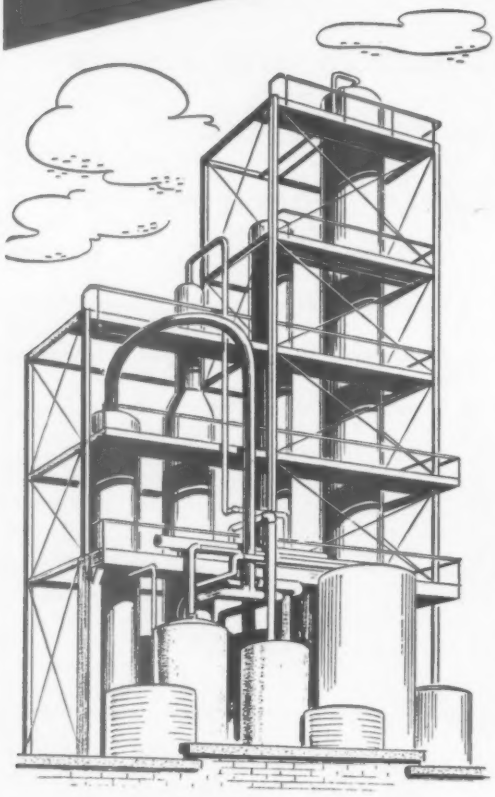
ACCURACY FIRST

IN HOME AND INDUSTRY

FURFURAL SOLVENT REFINING MEANS SAFE OPERATIONS

QO FURAN CHEMICALS

Here is information about Furfural itself, which will tell you why.



Handling

Furfural is a liquid at room temperature and its boiling point of 323° F. removes it from the class of substances which must be handled and stored under pressure. It is unlikely that appreciable concentrations will be built up in the air.

Explosive Hazard

Furfural has a flash point (open cup) of 135° F. and consequently introduces no problem in the way of extreme explosive hazard.

Freezing

The freezing point of furfural is —34° F. so even in severe weather, there is virtually no chance of freeze up in lines or tanks.

Toxicity

Over nineteen years experience in refineries throughout the world and thirty years of industrial experience in other processes demonstrate conclusively that furfural can be handled safely insofar as possible hazards to personnel are concerned.

Supply

In addition to the safety factors mentioned above, furfural is "safe" in the sense that it is readily available in quantity. It is produced at three different plants in widely separated locations. It is made from the non-food portion of agricultural products, such as corn cobs. Nature creates an abundant new supply of raw material each year.

Literature available

Bulletin 203 entitled "Physical Data on Furfural" contains comprehensive data, tables and curves on the physical characteristics of furfural. Bulletin 204 "Current Uses of Furfural" tells about various uses for furfural as a selective solvent, chemical intermediate, wettant and dispersant. Send your request to the nearest office below on your company letterhead.

QO CHEMICALS

The Quaker Oats Company CHEMICALS DEPT.

339C The Merchandise Mart, Chicago 54, Illinois
Room 539C, 120 Wall St., New York 5, N. Y.
Room 439C, P. O. Box 4376, Portland 8, Oregon

In San Francisco: The Griffin Chemical Company • **In the United Kingdom:** Imperial Chemical Industries Ltd., Billingham, England
In Europe: Quaker Oats-Graanproducten N. V., Rotterdam, The Netherlands; Quaker Oats (France) S.A., 42, Rue Pasquier, Paris 8e, France
In Australia: Swift & Company, Pty., Ltd., Sydney • **In Japan:** F. Kanematsu & Company, Ltd., Tokyo

They Say—

Worst Yet to Come?

"A recent survey of the Louisiana and Arkansas areas showed that there are practically no tubular materials available for drilling operations beyond September 30 and that many operators have already been forced to reduce wildcatting and field development work by as much as 25 per cent.

"The strike came at a most inopportune time. The entire industry was undergoing an unprecedented expansion, thereby making it almost impossible to build up any real reserve of materials.

"Thus, while severe repercussions are already being felt, the main blow to drilling is yet to come. Few new obligations can be assumed until it becomes clear when stocks of tubular goods will return to normal and few operators have sufficient pipe to carry through many more weeks of operations."

Editorial in the Mississippi Oil Review.

Latin-American Nationalism

"The parallel between Middle Eastern and Latin-American nationalism has often been noted. One aspect consists in biting off the particular nation's own nose to spite Uncle Sam's face (or, in the case of Iran, John Bull's face).

"When oil or some natural resource is concerned it is what may be called "economic nationalism," and in the case of our southern neighbors it is largely a heritage of the days of American intervention and economic exploitation.

"Those days are gone, but the anti-Yankeeism they helped to foster has far from expended itself. This is a significant feature of contemporary nationalism, which proves that the emotions behind the movement have deep psychological roots. If there were no "Colossus of the North" it almost seems as if our Latin-American friends would have to invent one so as to have a target for their xenophobia."

Editorial in the New York Times.

Oil Woman Objects

Sir:

As a Desk and Derrick Club member and president, "Journally Speaking," your article in the August 18 issue of The Oil and Gas Journal, entitled "Skirt Gathering," is a paraphrase of the jimson weed.

We "gals," as you refer to us, have planned an important and constructive convention, and its results will not be reflected through requests for any front seats nor what we will have been wearing.

Lest you forget, more women than men are in control of our financial securities, and more women than men are voting in our elections, and it is time for we ladies, and not "gals," to better understand our industries.

Not only do Desk and Derrick Clubs have in their membership officers, directors, administrators and "the like of which the petroleum industry has never seen" but it has owners of oil companies. As a director and secretary-treasurer for one of these companies, I suggest you look for that hole card you stuffed up your sleeve.

Irene Stimson
Panhandle Producing Co.
San Antonio, Tex.

Net Income Is Down

"Reports of leading industrial companies issued during July show aggregate dollar sales in the first half year maintained close to the 1951 level, but net earnings running below those of 1951 in about 7 out of 10 cases.

"Our tabulation of 526 companies, representative mainly of the large man-

"Utility Men" of the OIL FIELDS

HOBBS

OIL FIELD TRUCK BODIES

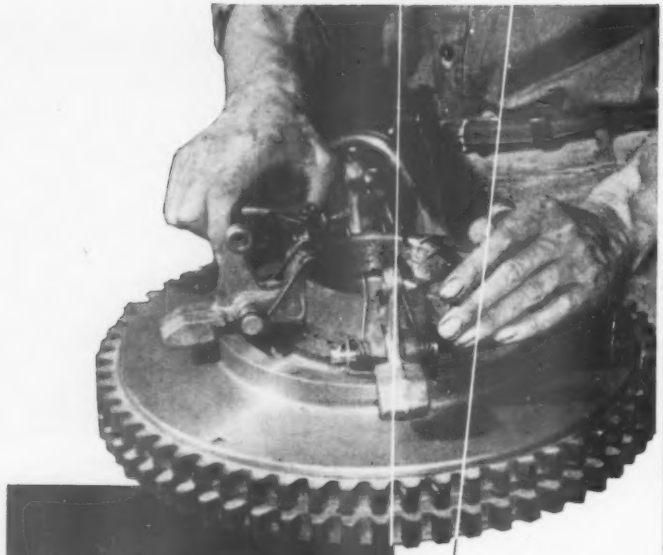
Standard model illustrated; also built in combination model having recessed, permanently mounted fifth wheel.

HOBBS TRAILER

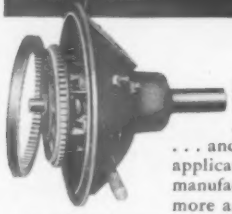
Full range of sizes for single and tandem axle trucks, 1½ to 12 tons. Specially built in larger sizes. Specifications and prices on bodies and all necessary equipment gladly forwarded on request.

HOBBS MFG. COMPANY

FACTORY SALES AND SERVICE — Fort Worth, Houston, San Antonio, Lubbock, Dallas, El Paso, Oklahoma City, Wichita, Kansas. (Distributor names and addresses on request.)



Cut Downtime . . .
Step up Worktime



More Friction Power Take-Offs . . . in more sizes . . . and in more fields of application than any other manufacturer. That's why more and more manufacturers and users of powered equipment are standardizing on Twin Disc Power Take-Offs.

Standardization on Twin Disc drives is a profit-making practice because it assures you (1) long work life; (2) ready availability of parts and services; (3) interchangeability of parts; (4) advantage of specialized "know how" by repair departments; (5) minimum parts inventory requirements.

Increased manufacturing facilities at Twin Disc assure you of quick delivery of both complete drive units and replacement parts. Complete parts stocks at 8 factory branches and 60 parts stations—which are staffed by service experts—bring quick service near to you.

8 Factory Branches and 60 Parts Stations strategically located.

$3¼ million of service parts and complete replacement units carried in inventory.

Built for a Long Life . . .
Backed for a Lifetime

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin · HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND · DALLAS · DETROIT · LOS ANGELES · NEWARK · NEW ORLEANS · SEATTLE · TULSA

ufacturing organizations but including also a limited number in the mining, trade, and service industries, gives combined net income for the half year of approximately $2,098 million after taxes, a decrease of 13 per cent from last year.

"As was also true in 1951, federal income and excess profits taxes took over half of the operating earnings."

Monthly Letter on Economic Conditions, Government Finance, published by the National City Bank of New York.

Lower Profits Ahead

"The company is now devoting more time and is spending more money on exploration work than at any time in its history.

"As a result of this and of lower income because of the declining production and higher charges from increased costs of materials, transportation, wages, and services, the company's earnings this year will be less than they were in 1951."

John W. Brice, president, in a letter to Carter Oil Co. employes.

CALENDAR

SEPT.

10 American Petroleum Institute, lubrication committee, business meeting, Traymore Hotel, Atlantic City, N. J.

10-11 American Society for Testing Materials, sessions during Centennial of Engineering, Hotel Sherman, Chicago.

10-12 National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J.

10-13 American Institute of Chemical Engineers, Chicago meeting, Palmer House.

11-13 American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago.

12-13 Association of Desk and Derrick Clubs of North America, first annual meeting, Shamrock Hotel, Houston.

13 Independent Oil Producers' and Land Owners' Association, Tri-State, annual oil men's fall meeting, Green Hills Country Club, Mt. Vernon, Ill.

13 Seventh National Chemical Exposition, Chicago Coliseum.

22-24 American Society of Mechanical Engineers, petroleum engineering conference, Hotel President, Kansas City, Mo.

24-25 Independent Petroleum Association of America, annual meeting, Skirvin Hotel, Oklahoma City.

25-26 Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo.

29-30 American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City.

OCT.

1- 3 American Institute of Mining and Metallurgical Engineers, Mid-Continent fall meeting, Rice Hotel, Houston.

Men who depend on power...know they can depend on CUMMINS®

Every CUMMINS DIESEL *is built not once but twice*

Oil field men have learned to count on Cummins Diesels for dependable power day in, day out.

What's behind this consistent reliability? One good reason is the fact that every Cummins Diesel is actually built *twice*. After initial assembly, and run-in testing, every engine is disassembled, inspected; then reassembled and tested again.

This extra care—together with Cummins' economy-proved fuel system and efficient parts and service organization—makes lightweight, high-speed (50-550 h.p.) Cummins Diesels a wise first choice *for men who depend on power.*

Whatever your power needs, whether it's for drilling, pumping, or hauling, portable power units or generator sets . . . or any other important jobs . . . your Cummins dealer is the man to see.

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana

Export: Cummins Diesel Export Corporation
Columbus, Indiana, U.S.A. • Cable: CUMDIEX

(O-82)

CUMMINS Diesel

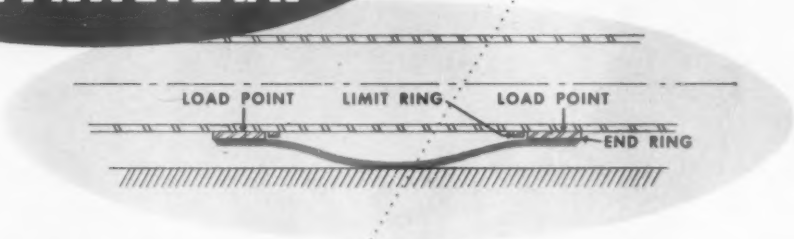
TRADEMARK REG. U. S. PAT. OFF.

***Leaders** in lightweight, high-speed diesel power!*

LOAD-TESTED SPRINGS NEVER TOUCH CASING

HALLIBURTON'S *new*

S-3 CENTRALIZER



The world's most experienced cementers designed the new S-3 Centralizer to give you less drag and less torque on the casing, while rotating, than any other Centralizer available.

There's no clutching or gripping. Load-tested springs do not come in contact with the casing. Hinge-type end bands allow ample clearance for free rotation with minimum drag.

Fewer springs, lap welded to end bands, offer less obstruction to circulation in the annulus. And the positive centering force assured by the S-3 provides more uniform cement distribution — one of the most important phases of your well completion program.

The engineering simplicity of Halliburton's S-3 saves you time and money. It's as easy to install when running casing as slipping on a ring. And one size S-3 for each casing O.D. size fits all standard hole sizes without on-the-job adjustment. No welding is required when hung over collars and only minimum welding when end limit rings are used for selective spacing.

Get this positive centering force, with least casing drag. Phone your nearby Halliburton representative and see how S-3 Centralizers save time, labor, and money. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN CEMENTING TECHNIQUE

1- 3 National Association of Corrosion Engineers, South Central Region, technical program and committee meetings, Jung Hotel, New Orleans.

2-3 Petroleum Electric Power Association, annual conference, Mayo Hotel, Tulsa.

3- 5 New Mexico Geological Society, annual field conference, Santa Fe.

4 John Zink Process Heating seminar, John Zink Co. plant, Tulsa.

6 Independent Natural Gas Association of America, annual meeting, Fontenelle Hotel, Omaha, Neb.

6 Natural Gasoline Association of America, school on low temperature fractional analysis of petroleum gases and liquids, University of Oklahoma, Norman.

9-10 California Natural Gasoline Association, twenty-seventh annual fall meeting, Ambassador Hotel, Los Angeles.

12-18 Oil Progress Week.

13-15 Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth.

13-17 American Institute of Electrical Engineers, fall meeting, New Orleans.

16-17 Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.

16-19 Permian Basin Oil Show, Odessa, Tex.

20 Texas Independent Producers and Royalty Owners Association, mid-year directors' meeting, Austin.

20-23 Society for Non-Destructive Testing, Inc., annual meeting, Hotel Sylvania, Philadelphia.

22-24 Society of Automotive Engineers, national transportation meeting, Hotel William Penn, Pittsburgh, Pa.

23-24 American Institute of Mining and Metallurgical Engineers, petroleum branch, West Coast fall meeting, Statler Hotel, Los Angeles.

23-24 Independent Petroleum Association of America, annual membership meeting, Skirvin Hotel, Oklahoma City.

24 Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex.

27-28 Society of Exploration Geophysicists, Eastern Canada meeting, King Edward Hotel, Toronto, Ont.

27-31 American Gas Association, annual convention. Atlantic City, N. J.

30-31 American Association of Petroleum Geologists, Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists, annual fall meeting of Pacific sections, Statler Hotel, Los Angeles.

30-Nov. 1 Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver.

NOV.

3- 4 Society of Automotive Engineers, national diesel engine meeting, Chase Hotel, (tentative), St. Louis, Mo.

5- 7 Industrial Management Society, 16th annual time and motion study and management clinic, Sheraton Hotel. Chicago.

6- 7 Society of Automotive Engineers, national fuels and lubricants meeting. Mayo Hotel, Tulsa.

6- 8 Gulf Coast Association of Geological Societies, annual fall meeting, Hotel Driscoll, Corpus Christi, Tex.

8-13 Oil Industry Information Committee Conrad Hilton Hotel, Chicago.

Wanta pump something at lower cost?

CHECK HERE

Air	Dye Solutions	Latex	Salt Water
Alcohol	Edible Oils	Mash	Shortening
Ammonia	Ethane	Methane	Sludge
Beer	Fish Oils	Milk	Soap
Benzol	Formaldehyde	Molasses	Sodium Chloride Solution
Boiler Feed Water	Fresh Water	Naptha	Sodium Silicate
Brewer's Mash	Gas, Manufactured	Nitric Acid	Sodium Sulfate Solution
Butter	Gas, Natural	Nitrogen	Starch
Butane	Gasoline	Oil, Crude	Sulphuric Acid
Cane Syrup	Glucose	Oil, Refined	Sump Water
Calcium Carbonate Slurry	Glue	Oxygen	Sweet Water
Calcium Sulfate Slurry	Glycerine	Paint	Tomato Juice
Casein Solutions	Glycols	Potassium Hydroxide	Varnish
Cement Slurry	Hydrochloric Acid	Propane	Vinegar
Chocolate	Hydrofluoric Acid	Raw Boiler Feed Water	Viscose
CO_2 Gas	Ink	River Water—Dredging Operations	Water (various)
Crude Oil	Jam	Rosin	Wax
Dairy Products	Jelly		Whey
	Ketchup		
	Lacquer		

THIS list of fluids will give you a rough idea of the diversity of pumping jobs in which Darcova Pumcups are responsible for really *big* savings.

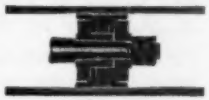
It boils down to the fact that Pumcups all but eliminate fluid slippage *throughout* their life span . . . and they *last many times as long as other packings.* Think of the down-time avoided, the production gains due to prolonged high efficiency, and the time-and-money-saving reduction in maintenance!

Years of application research have gone into the development of Pumcups. Made today in standard as well as many special compositions and textures for a wide range of temperature and pressure conditions, they offer you superior cost-cutting service in virtually *any* pumping job, simple or tough! And they're available in diameters from 1 to 20 inches.

SEND FOR FREE BULLETIN

Why not weigh *all* the facts? Bulletin 4401 covers Darcova Pumcups for reciprocating pumps; Bulletin 4502 on Pumcups for air or hydraulic mechanisms. Write for yours today.

DIAGRAM OF DARCOVA PUMCUP ACTION (greatly exaggerated)



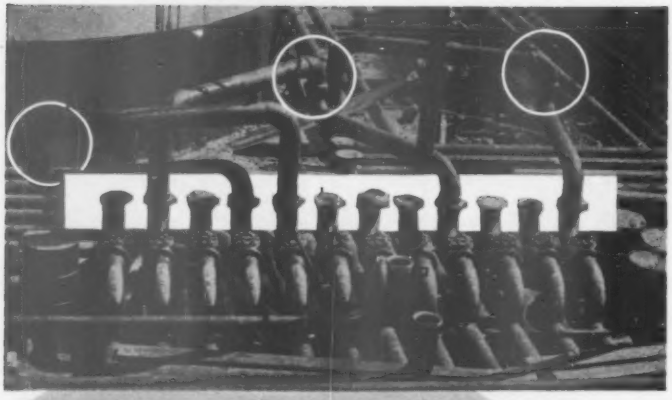
NORMAL: BOTH PUMCUPS RELAXED

UNDER PRESSURE: PUMCUPS SEAL AGAINST CYLINDER DESPITE WEAR, MINIMIZING SLIPPAGE

DARLING VALVE & MANUFACTURING CO.
WILLIAMSPORT 1, PA.

DARCOVA
THE ORIGINAL COMPOSITION CUP

PUMCUPS



QUICK CHANGE ARTIST...

for transfer lines, terminal installations, manifolding, scraper box and jumper assemblies

• Switching from a blanking union to regular union is a simple, easy job with the WECO FIG. 208 Union. There are only two parts to remove . . . the wing nut and plug. Reversing the connection is just as easy and simple.

The Fig. 208 has less weight . . . less bulk . . . is easier to handle. All parts are interchangeable. The plug and male sub have an "O" ring to protect the metal to metal seal against corrosion and abrasion.

The WECO Fig. 208 has threaded ends . . . the Fig. 209 has ends bored for welding. Available in 3", 4", 6", 8" and 10" sizes. Ask your WECO Representative for details about the wide range of applications of the Fig. 208 Union.

WECO FIG. 208 BLANKING UNION

• Note the simplicity of the Fig. 208 Union and the ease with which it can be made up as a regular or blanking union.

Chiksan Ball Bearing Swivel Joints, (encircled) add greatly to the efficiency of this terminal installation.

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WELL EQUIPMENT MFG. CORP.

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CHIKSAN EXPORT COMPANY Brea, Calif. Newark 2, N. J.

Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

10-13 American Petroleum Institute, thirty second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.

13-14 Society of Exploration Geophysicists, midwestern meeting, Texas Hotel, Fort Worth.

17-18 American Institute of Electrical Engineers, subcommittee on electrically operated recording and controlling instruments, technical conference, Benjamin Franklin Hotel, Philadelphia.

20-22 Instrument Maintenance Short Course, jointly sponsored by Southern California Meter Association and Los Angeles Harbor Junior College.

21 Natural Gasoline Association of America, district meeting, Herring Hotel, Amarillo, Tex.

30-Dec. 5 American Society of Mechanical Engineers, Statler Hotel, New York City.

DEC.

1- 3 New Mexico Oil and Gas Association, annual meeting, Albuquerque.

1-6 American Society of Mechanical Engineers, twentieth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.

5- 6 Interstate Oil Compact Commission, winter meeting, Wichita, Kans.

7-10 American Institute of Chemical Engineers, annual meeting, Hotel Cleveland (Hqs.) and Carter Hotel, Cleveland.

1953

MAR.

2- 6 American Society for Testing Materials, spring meeting, Statler Hotel, Detroit.

16-20 National Association of Corrosion Engineers, Hotel Sherman, Chicago.

18-20 American Petroleum Institute, annual spring meeting, Mid-Continent district, division of production, Mayo Hotel, Tulsa.

23-26 American Association of Petroleum Geologists, Society of Exploration Geophysicists, and Society of Economic Paleontologists, annual meeting, Rice and Shamrock Hotels, Houston.

27 Natural Gasoline Association of America, regional meeting, Scharbauer Hotel, Midland, Tex.

30-31 Texas Independent Producers and Royalty Owners Association, annual meeting, San Antonio.

APR.

8-10 American Petroleum Institute, division of production, Eastern district meeting, William Penn Hotel, Pittsburgh.

21-23 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman.

27-28 Independent Petroleum Association of America, mid-year meeting, Jefferson Hotel, St. Louis.

Apr. 29-May 1 Natural Gasoline Association of America, annual convention, Rice Hotel, Houston.

MAY

11-13 Southern Gas Association, Jung Hotel, Hotel, New Orleans.

14-23 International Petroleum Exposition, Tulsa.

24-27 American Gas Association, production and chemical conference, Hotel New Yorker, New York City.

28-29 Natural Gas and Petroleum Association of Canada, London, Ont.

A STABLE ARC, GOOD DIRECTIONAL CONTROL, AND WIDE USEABILITY CHARACTERISTICS ENABLE YOU TO . . .

Weld Stainless Easily in ALL Positions with G-E Stainless Steel Electrodes

36 TYPES ASSURE YOU OF THE RIGHT ELECTRODE FOR EVERY JOB

You get the most for your dollar when you buy General Electric stainless steel electrodes. Here are seven reasons why:

1. You get excellent handling characteristics in *all positions.*
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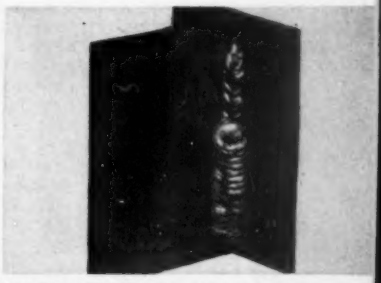
712-19

GENERAL ELECTRIC



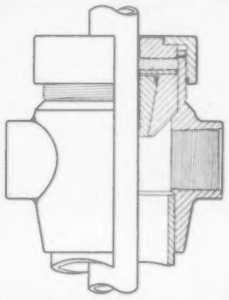
SMOOTH, NEAT WELD made with lime type W-1310, reverse polarity DC electrode.

VERTICAL FILLET weld made with W-2310, titania type, AC or DC reverse polarity.

HINDERLITER HW TUBING HEADS

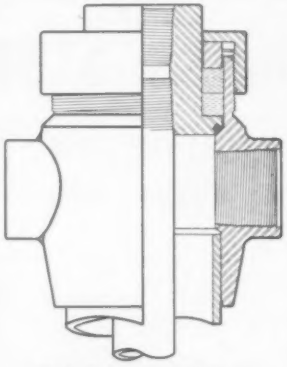
(Patented)

for 30 years the standard production heads of the industry!

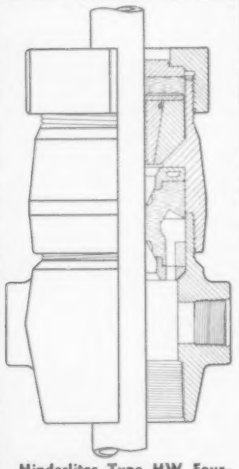


Hinderliter Type HW Two-In-One Tubing Head complete with Slip Suspension.

THE best known well head in the industry because — you caused it to be designed to solve your producing problems. More than thirty years of experience in the manufacture of casing and tubing heads goes into the modern Type HW Two-In-One and Four-In-One Tubing Heads. The rugged construction of the Type HW heads puts the "beef" where you need it, no thin spots around openings. Recommended for 67,200 lbs. tubing weight, it is fabricated of drop forged steel. Available with threaded or flanged bottoms.



Hinderliter Type HW Two-In-One Tubing Head complete with Hanger Suspension.



Hinderliter Type HW Four-In-One Tubing Head. Can be used to perform almost any production or work-over operation without removing the head from casing.

The complete line of Hinderliter Tubing and Casing Heads comprises types to fit every drilling, completion and production process.

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

We Plan a Probe

WE'RE getting ready, in a limited way, to begin an investigation of the federal Government.

Not of course, in the secret-report, grand jury manner so fashionable now in Washington. We're not really qualified by experience for so grandiose a performance. And, besides, the Big Yellow Book isn't up for reelection.

No, this investigation will be a very minor one with the unusual purpose of merely picking up a little information.

Its background is simple. We just discovered the existence of the United States Board on Geographic Names, of the Interior Department.

All this time we've been tossing about place names like Nagyszalonta, Biharnagybajom, Almafuzito, and Petfurdo without the slightest qualm. Some of our authors have been to, or lived in those places, believe it or not, and it seldom seemed necessary to check up on their spelling. And when we did double check, the gazetteer in Webster's or a map of the National Geographic Society usually bore them out.

But now comes the U.S.B.G.N. with an authoritative-looking booklet listing all its many publications on nomenclature of foreign places. It even mentions modestly that spelling of those names is "standardized by board decisions."

It's enough to make a man wonder. Take Warsaw, for example. It appears Warszawa on some maps. And in some places Moscow is Moskva. But the choice always seemed obvious.

Now a sliver of doubt has pierced our hard-shelled certainty. Not until we solve the puzzle of who holds undisputed authority in dictating the spelling of a name can we report to you with absolute confidence about a dry hole drilled in Svalbard. Or Piombino. Or Hayrabolu.

We're going to investigate!

We Report One

WHILE speaking of investigations, we'd like to pop a vest button or two over the way in which our favorite oil publication in the past couple of weeks has covered for you the Government's broad cartel charges.

If you noticed, on the day the FTC report was released, the Big Yellow Book landed in your office with a complete 5-page summary of the FTC's long-suppressed and much-talked-about accusations.

For a weekly magazine published in Tulsa to hit its readers in Texas, Illinois, and points in all directions with the news that up to date normally isn't possible.

Much of the credit for the fast work goes to our Washington editor, Bertram F. Linz. We aren't sure exactly how he worked, but he must have put to good use the 30 years of experience he has had in covering the Washington beat.

Bert was able to summarize the major aspects of the 378-page government-agency report and wire between 4,000 and 5,000 words in time to meet our mechanical deadline.

Oklahoma subscribers, so close to Tulsa that readers often get their magazines on the Saturday before publication date, posed another problem. To keep from violating the Monday release date we asked the postoffice to delay mailing those copies.

Bert's coverage of the important report was in Journal readers' hands by the time the major-company executives were able to see the report. For this reason, there was no opportunity to present in the August 25 issue the companies' position.

That came last week, when Bert and one of our New York men, Dahl M. Duff, who writes most of the international news you read, combined their efforts to present later developments in the Government's attack on the industry, together with comment of the oil-company executives and some explanation of their position.

As some have pointed out, the cartel charges aren't operating material which will help a tool pusher do his job better. Yet we felt the space given the story was justified as a part of the Journal's continuing effort to keep you fully informed of all news developments affecting our industry.

Ted A. Armstrong

duplex

DUPLEX

.....a good name to remember

Baker DUPLEX Cement Wash-Down Whirler Float Shoe — Product No. 360

WHAT YOU CAN DO WITH BAKER DUPLEX EQUIPMENT

successfully cement liners, combination strings, and perform certain types of two-stage cementing.

cement blank sections of pipe below a perforated section, without any need to use auxiliary equipment.

wash out cavings ahead of the string when setting a liner. Without DUPLEX Equipment you can circulate only through the topmost perforations—with DUPLEX you can circulate clear to bottom.

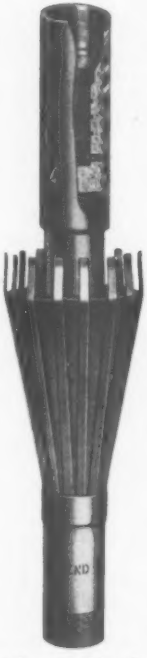
you can control the amounts of materials used, and (without change) run caustic or oil, then run plastic, in sequences and quantities as desired.

you eliminate the need for auxiliary equipment (such as retainers or retrievable cementers) when you use Baker DUPLEX.

you can use DUPLEX equipment either with or without a liner hanger.

you have complete control of the liner at all times when DUPLEX Equipment is used. The liner can be raised or lowered, and is positively held down in place while cementing

a bridging ball can be dropped (after cementing) and circulation carried on above the DUPLEX Equipment without disturbing the green cement.



Baker Combination Product No. 383 with a DUPLEX Whirler Float Collar. Cement is held above the Metal Petal Basket.

How DUPLEX Equipment is made

DUPLEX Float Shoes and Collars are similar to other Baker Float Shoes and Collars in most features, but have a female left-hand thread assembly (of drillable cast iron) accurately anchored just above the Back-Pressure Valve. By means of a mating male Left-Hand Square Thread Sub, the cementing string is easily connected to (or disconnected from) the DUPLEX Shoe or Collar.

How DUPLEX Equipment Operates

In simple liner work, a DUPLEX Wash-Down Whirler Float Shoe is connected to the bottom joint and the balance of the liner is run into the well, with the last joint held in slips or clamps. A cementing string of sufficient length then is run to connect the male Left-Hand Square Thread Sub to the female left-hand assembly in the shoe, to form a quick, fluid-tight connection.

The portion of the cementing string above the liner is then run, with the DUPLEX connection carrying the weight of the liner. After cementing, the back-pressure valve prevents any flow-back of cement slurry placed outside the liner. The cementing string is then disconnected by rotating to the *right;* excess cement washed out; and the cementing string removed from the well.

Various combinations of Baker DUPLEX Equipment are used to perform more complex operations, such as cementing behind liners at different levels; cementing above and below cavities; between producing zones; and similar work.

The Baker representative or office nearest you is available to discuss proper use of Baker DUPLEX Equipment in your well completions.

BAKER OIL TOOLS, INC.

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GUIDING, FLOATING AND CEMENTING EQUIPMENT

DUPLEX

Tidelands move into big league politically

WITH both presidential candidates already on record, the tidelands dispute, involving future ownership of submerged coastal oil lands, has moved into the big league politically.

This is fine if out of the move comes a clear national understanding of the facts, and legislation is quickly enacted reestablishing state ownership. But much remains to be done if this goal is to be reached.

Last week an inland senator who is a member of the important Department of Interior legislative committee said he would oppose any compromise as "an evil surrender of the people's rights to rich and powerful oil companies."

The senator knows that the statement in all its implications is wrong, but he and several other Congressional and high governmental officials believe that their ends can best be attained by trying to convince the public that this is a fight of Government vs. oil companies.

ACTUALLY, except for protecting their properties developed before the Supreme Court decisions, oil operators are on the sidelines in this argument. Should the Government's position be made effective by the required legislation, the tidelands will become public lands. Assuming reasonable regulations, operators will then proceed with further exploration and development programs.

There is, however, the issue having to do with the steady encroachment of federal over states' rights in which oil men and all citizens have a stake.

While government officials and the uninformed press and radio often refer to the states' objectives as a "steal," any theft is on the other side. Until the 1947 United States Supreme Court decision in the California case, the rights of the states to their offshore lands were never seriously questioned. A long list of judicial decisions had supported the states' legal position and California tidelands were partially developed.

IN this connection Senator Sparkman, a vice-presidential aspirant, asked: "Is the Supreme Court really to have the last word or are its decisions to be the cue to Congress to write new laws to override these decisions." A similar statement by the presidential candidate of the same party reveals how, up to now, both have missed the controlling factor of public policy involved, which goes much deeper than a court decision.

Two Congresses by large majorities recognized the rights of the states and attempted to reestablish the pre-1947 status, but their actions were nullified by presidential vetoes. Washington still hopes to bring about a reversal in majority thinking. Texas, Louisiana, and California, realizing that the major principles involved extend to the four corners of this country, have made it a national issue.

Regardless of party affiliation, the next few weeks, because of these and related matters, present a challenge to oil men everywhere.

There's more than acid to acidizing

Dowell Addition Agents

HELP SOLVE WELL PROBLEMS

Successful acidizing treatments demand more than just acid. Any well may present problems that call for special chemicals to be added to the acid. These *addition agents* can make the difference in the well's production.

Twenty years ago, Dowell pioneered acidizing by adding an "inhibitor" to hydrochloric acid. Since then Dowell has developed many other chemical addition agents for use in well treating. Dowell acidizing service has proved itself in every major oilfield. When you want the best in acidizing, call Dowell. Successful experience, the right materials and trained engineers are a combination that means results!

There's a Right Dowell Acid for Your Well

TO REMOVE MUD—Ask for *Dowell Mud Acid* . . . contains chemicals to make the acid capable of dissolving the clays found in producing formation and the clays commonly used in drilling muds.

TO SPEED REACTION RATE—Ask for *Dowell XX Acid* . . . contains intensifier to increase reaction rate on dolomitic formations and provides better solvent action on other formations.

TO REDUCE SILICATE SWELLING—Ask for *Dowell XM Acid* . . . contains chemicals to speed well clean-up. It reduces swelling of silicates found in clay minerals, a problem often encountered in acidizing treatments.

TO PREVENT EMULSIONS—Ask for *Dowell XW Acid* . . . contains an agent to help prevent the formation of emulsions and to aid in breaking emulsions which have already been formed.

TO INCREASE PENETRATING ABILITY—Ask for *Dowell XF Acid* . . . contains surface tension reducing agents to increase penetrating ability of the acid. Aids return of spent acid and permits treatment of relatively fine pores.

TO REMOVE "GYP"—Ask for *Dowell XG Acid* . . . contains a foaming agent to use in removal of "gyp" from tubing or face of pay zones.

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Bulk Inhibited Acid • Chemical Cleaning for Heat Exchange Equipment

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"First in Oilfield Acidizing . . . Since 1932"

Look to **DOWELL**

FOR OIL INDUSTRY CHEMICAL SERVICE

LIMITED PRODUCTION now is the rule in Venezuela's Lake Maracaibo area. Most of the production here is heavy oil, and there is currently a market slump due to low seasonal demand for fuel oil. Creole Petroleum Corp., Venezuela's biggest operator, recently was reported to have 110,000 bbl. of daily production shut in in the lake area, with several other companies also holding down output. Shown here are a few of the hundreds of wells which dot the water of the big lake, which lies at the foot of the Andes Mountains.

GOVERNMENT.—United States signs new trade agreement with Venezuela dropping quota system on oil imports. . . . New agreement sets tax rate on crude-oil imports at 5¼ cents on crude under 25° gravity and 10½ cents on oil 25° and higher. . . . ¶Grand jury sworn in in Washington to hear Justice Department present Federal Trade Commission's charges that a cartel exists in the petroleum industry. . . .

PRICES.—PAD announces it favors increasing ceilings for crude oil in California. . . . Price hike, PAD tells OPS, would encourage exploration, development, and secondary-recovery activity and would attract crude from other areas. . . . ¶At the same time, PAD declined to support an application to increase price ceilings for Pennsylvania Grade crude. . . . PAD said lube-oil crudes now in ample supply and, too, price hike would not result in a much bigger Penn Grade production than now exists. . . .

EXPLORATION.—Amerada Petroleum Corp.'s isolated Sturgeon Lake discovery is hailed as most important oil prospect to date in Alberta's Peace River region. . . . ¶Phillips Petroleum Co.'s 1 Glenna cracks record for deep production in the Permian basin of West Texas. . . . Well was completed in the Ellenburger at 14,522 ft., total depth. . . . ¶Texaco completes its 2 Grebe confirmation well in the northwestern area of Rosebud County, Montana. . . .

INTERNATIONAL.—Number of rotary rigs operating outside the United States and Canada now totals 620, new all-time record. . . . Venezuela most active with 122 operating, up 27 from a year earlier. . . . ¶Thumbs-down gesture expected from Iranian Parliament on recent British-American offer to settle nationalization dispute. . . . London and Washington reported exasperated with Mossadegh as a result of his immediate condemnation of the proposal. . . . ¶Contracts between Petroleos Mexicanos and United States contractors are ruled legal by Mexico's attorney general. . . . Ruling given after charge by opposition member of congress charged they violated the constitution and the 1938 expropriation law. . . .

REFINING.—Anglo-Iranian reveals further details on its new "Autofining" desulfurization process. . . . ¶Cities Service lets contract to J. C. Berkwit & Co., New York, to dismantle its 8,000-bbl. refinery at Petty's Island near Camden, N. J. . . . ¶Sinclair Refining contracts for construction of a new propane de-resining unit at its 9,000-bbl. plant at Wellsville, N. Y. . . .

TRENDS.—Announced allowables indicate production of crude and lease condensate amounting to about 6,570,000 bbl. daily in September. . . . Crude imports are estimated at about 555,000 bbl. daily to give total new supply of 7,125,000 bbl. daily. . . . If crude transfers, exports, and losses average about 100,000 bbl. daily, 7,025,000 bbl. daily will be available for refinery runs without taking any crude from storage. . . .

ACTIVITY.—Crude and lease condensate production averaged 6,281,525 bbl. daily for week ended August 30, down 11,600 bbl. daily. . . . ¶Well completions for the week decreased 82 wells to 852. . . . Wildcat completions were off 34 wells to 194. . . . ¶Rotary rigs operating in United States on September 1 totaled 2,352, an increase of 39 rigs for the week. . . .

Trade Pact Signed

United States agrees to drop quota system on oil imports from Venezuela and to cut levy on crude below 25° gravity

WASHINGTON.—A new reciprocal-trade agreement with Venezuela has been signed at Caracas. The agreement changes the pattern of oil imports for the second time in less than 2 years.

It totally eliminates the present quota system and establishes new import-tax rates on crude petroleum and residual fuel oil of 5.25 cents per barrel on oil under 25° gravity and 10.5 cents per barrel on oil of 25° gravity or higher.

The new treaty will go into effect 30 days after exchange of a proclamation by the President and an instrument of ratification by Venezuela, and the new tax rates will apply to imports of petroleum from all parts of the world outside the Communist orbit.

The petroleum provisions of the new agreement will supersede the provisions of the prewar agreement with that country, providing for a tax of 10.5 cents per barrel on oil imports up to 5 per cent of continental United States refinery throughput. The quota provision, in turn, had been suspended by a trade agreement with Mexico in the early days of the war and was reinvoked last year following termination of the Mexican agreement December 31, 1950.

Escape clause . . . While the quota system is eliminated under the new arrangement, and in fact all quotas are banned except on agricultural and fishery products, the State Department pointed out that in the event of necessity it could be revived under the escape clause in the agreement.

A State Department explanation of the agreement disclosed that the Tariff Commission was divided as to what constitutes the import-tax "peril point"—the tax rate below which volumes of imported oil would increase to the point of endangering the domestic industry. Three members of the commission found that the tax rate under the present quota system was the lowest feasible; three others found that a rate of 10.5 cents per barrel would not cause or threaten serious injury.

The President sided with the latter group. He immediately sent a message to Congress explaining his action, in which he declared that experience during 1943-50 indicates that imports at 10.5 cents "will undoubtedly prove no deterrent to drilling and development programs now under way in the United States.

"Most of the crude oil produced in the United States has a specific gravity of 25° A.P.I. or higher," the President said. "The national average is about 35° gravity A.P.I. For example, less than 1 per cent of the crude oil produced in West Texas is below 25° gravity A.P.I. Most of the heavier crude oils in the United States are produced in the Rocky Mountain area, in California, and in some of the Gulf Coast area.

"About one-third of the Venezuelan crude-oil production has a gravity of less than 25° A.P.I. Nearly all of the low-gravity oil is shipped to the refineries on the islands of Aruba and Curacao."

Few benefits . . . The President, continuing, said that only the asphalt crudes, some of the topped crude, and the residual fuel oil will benefit by the lower tax. He pointed out that, generally, imports of these oils sell in markets different from those in which domestic low-gravity oils are sold. Also, he said, the lower-gravity oils have a lower value in the market, and it is believed appropriate that these commodities of less worth should be dutiable at a lower specific rate and that the more valuable oils should pay a higher rate.

"The imported oils which would pay the lower tax are among those which are in relatively short supply in the United States and generally throughout the world." the message continued. "It is not expected that the lower tax applicable to such oils will cause an undue increase in imports above the quantity which otherwise might be imported."

Some uncertainty . . . State Department officials, however, appeared less certain that the new rates might not result in increased imports. They did not anticipate an immediate increase but conceded that there might be an increase over a longer period. They were unable to estimate its probable extent.

However, officials said, the agreement represents the best deal that could be made to achieve the objective of giving Venezuela a concession on the bulk of their exports to us without doing injury to the domestic industry or threatening the success of the reciprocal-trade program. The split at 25° gravity, they said, was adopted as the most convenient way of accomplishing this.

Agreement imperative . . . Failure to consummate an agreement, it was contended, might have led to a tremendous increase in duties on American goods imported into Venezuela, which normally is our second largest export market. In turn, the United States is the most important market for Venezuelan oil and will shortly be the market for iron ore from reserves now being developed.

The move for a new trade agreement with Venezuela started early in 1951, a few months after abrogation of the Mexican agreement again brought the quota provisions into effect.

Hearings were held by the Tariff Commission at which independent domestic producers opposed any change downward in tax, and spokesmen for companies operating in Venezuela contended that the rate of tax had no serious influence upon imports.

The Tariff Commission made its report last December 27, and early this year negotiation of a new agreement was undertaken, first in Caracas, then Washington, and finally again in Caracas, where the agreement was signed.

How Tariffs Are Changed

UNDER the current reciprocal-trade agreements act the Tariff Commission makes a study of each article on which it is proposed to reduce duties or other concessions. It then submits a report to the President as to how much he might lower duties without causing or threatening serious injury to domestic industry.

The commission's reports are not binding upon the President, but if he makes tariff cuts or other concessions below the "peril point" he must submit a report to Congress explaining the reasons for his action.

Relief under the escape clause can be sought by domestic industry in the event it believes imports stimulated by trade-agreement concessions are causing serious injury. If the Tariff Commission believes the complaint well-founded, it makes an investigation. If

it finds serious injury is being caused it makes recommendations for relief to the President. Again, however, the commission's findings are not binding upon the President, and he can reject its recommendations but must explain his action to Congress.

Reimposition of the quota system could come only as the result of a finding by the commission and acceptance of that finding by the President that the quota's elimination had caused hardship to domestic oil producers. The unlikelihood of such action is evidenced by past experience—the domestic producers have made several unsuccessful efforts to have the commission investigate oil imports, and the President this summer twice turned down commission recommendations for application of the escape clause.

Grand Jury Sworn

Justice Department ready to present "cartel" evidence

WASHINGTON.—A special federal grand jury was sworn in here September 3 to receive evidence from the Department of Justice designed to show the existence of monopoly in the oil industry, at home and abroad.

Records of 21 oil companies have been subpoenaed by the Government. Some of the companies have secured extensions of time in which to submit their records, and others are resisting the Government's demands on the ground they should not be forced to reveal information which might fall into the hands of competitors.

A motion by Standard Oil Co. (N. J.) based on that ground is scheduled to be argued in the district court here September 10. Motions also have been submitted to require the department to clarify the issues involved in the investigation.

The Government's case is being presented by a special Justice Department staff headed by Leonard Emmerglick, antitrust division attorney who successfully prosecuted antitrust charges against the Aluminum Co. of America.

The grand jury investigation ties in with both the recently released Federal Trade Commission report charging the existence of a world oil cartel and the suits filed in New York last month to recover alleged overcharges on Marshall Plan shipments of oil to Western Europe from the Middle East.

Foreman of the jury is Frederick W. Butler, an auditor, and deputy foreman is Russell J. Barger, a transportation rate specialist for the Army.

WATCHING WASHINGTON

Bertram F. Linz

Price-Hike Ammunition

Domestic oil producers believe they have an added argument for the raising of ceiling prices on crude in the higher cost of tubular goods resulting from the $5.20 per ton increase given steel producers.

By the time the higher-priced steel reaches the producers, the increase of $5.20 amounts to as much as $11 per ton on tubing and drill pipe. Added to all the other increased costs occurring since the invasion of Korea, the producers feel they are under a burden which now must be recognized by the Office of Price Administration.

All efforts to secure higher ceilings have so far proved unavailing, and there is no indication of any relief in the immediate future.

Price Director Ellis Arnall has resigned and has been succeeded by Tighe Woods, formerly rent controller. Woods has indicated he will spend this month acquainting himself with his new job and then will stump the country to sell the need for price controls—just in advance of the election.

Accordingly, it's not likely that anything will be done on crude prices until after the election, and then what is done may depend on how the election goes.

Decision at Last?

A final decision on ownership and management of the tidelands next year is practically inevitable.

If the Republicans come into power, no difficulty is foreseen in enacting legislation returning the offshore oil lands to their original state owners.

If Gov. Adlai Stevenson becomes President, an effort will be made to work out a compromise that will be acceptable, if not satisfactory, to both state and federal interests. However, it is possible that Stevenson's determination may be tested first on a quitclaim bill, such as has twice been passed by Congress and twice rejected by President Truman.

There is a general feeling in Washington that something must be done to enable the resumption of development off the Gulf Coast which has been at a standstill for 2 years. Too much money has been invested already and too much time lost in developing a substantial addition to available reserves which might be sorely needed in the event of war to permit the present stalemate to continue indefinitely.

Already, oil experts in the Interior and Justice Departments and on the staff of the Senate Interior Committee are "exploring" the possibilities of legislation to be pressed in Congress in the event Stevenson is elected.

Anything developed would be along the lines of Stevenson's statement, after his conference last month with Governor Shivers of Texas, that settlement of the controversy should be "mindful of the respective interests of the states and the federal Government." His statement is generally interpreted as meaning the states would be given some share of the control of the tidelands and a substantial cut of the revenues.

But it was only in the committee that a compromise was even suggested. Interior and Justice let it be known they stood firmly on their all-or-nothing position, with emphasis on the "all," and would not consider giving anything more to the states than a modicum of exercise of their police authority, to salve their pride, and a minority share of the oil revenues.

Indications are that there will be no compromise legislation ready for introduction when Congress convenes January 3 (17 days before the new President is sworn in) although a number of quitclaim bills will be introduced — the great majority by Democrats. The fight over tidelands ownership, however, will not develop for some weeks.

When the new President takes office next January 20 he will bring with him a new attorney general and secretary of commerce who can be expected to be men who will back up his policies. If they are Stevenson men, both departments will sidle quietly to the right and come up with reasons why the states should get a better deal to bring about a final settlement of the issue.

Steel Applications Due

Coming authorizations for buying tubular goods will be for first quarter; third-quarter tickets good until then

WASHINGTON. — Issuance of authorizations for purchases of oil-country tubular goods, dislocated by the recent steel strike, will get back on regular schedule with allocations for the first quarter of 1953.

Applications for first-quarter authorizations of drill pipe must be filed with the Petroleum Administration for Defense by September 15 and for casing and tubing by October 1.

Oil and gas operators' fourth-quarter activities will be covered by authorizations originally issued for third-quarter purchases. The National Production Authority late last month issued orders making those authorizations valid through December 31, rather than November 30 as originally ordered.

Output lagging . . . "Production of oil-country tubular goods has fallen approximately a full quarter behind schedule," it was explained by Deputy Administrator J. Ed Warren.

"The steel strike lost some 70 days of production, and there already had been a carry-over of unfilled first-quarter orders that would take about 20 days of production. To get authorizations current with production, then, it was necessary to skip one full quarter of authorizations and let the third-quarter tickets take care of the output for the rest of the year," Warren said.

"We were also anxious to prevent any discrimination against the operators who get their pipe from distributors rather than from the mill. A substantial part of the distributors' third-quarter orders probably will not be filled until December. If we had not extended the validity of the third-quarter tickets, many operators who depend on the distributors' stocks would have been unable to cash their authorizations."

Few requests approved . . . Only a few authorizations for casing, tubing and drill pipe from regular mill production are being issued for the fourth quarter, Warren said.

Operators will get only 31,000 tons of the 434,665 tons of conversion oil-country tubular goods they requested for the fourth quarter because of the low rate at which mills are currently operating.

"A" operators, who normally drilled fewer than 40 wells in a year, filed 571 applications for a total of 179,665 tons of pipe. Only 165 of these applications could be approved, for 12,523 tons.

"B" operators, who normally drill 40 or more wells a year, filed 76 applications for 255,000 tons of pipe. Authorizations for 18,477 tons were divided among 56 applicants, on the basis of 8 per cent of each applicant's normal quarterly need less any advance conversion allotment he had already received for the third quarter.

Under normal circumstances, Warren explained, most of the operators whose applications were denied would have been granted an allotment and those who did get allotments would have been given larger ones.

FTC Considering Changes

WASHINGTON. — The Federal Trade Commission is understood to be considering new ways of dealing with violations of the Robinson-Patman Act, possibly because of difficulties in court in some of its cases.

It has been proposed that violations be settled informally by stipulation and trade-practice conference, which would mean disposing of them through negotiation and consent rather than by the formal complaint and cease-and-desist method.

The suggestion is being vigorously opposed by the House small-business committee, which calls it "extra-legal" procedure that would substantially lessen the effectiveness of the law.

Price Hike Disapproved

WASHINGTON. — The Petroleum Administration for Defense has declined to give its support to higher prices for Pennsylvania Grade crude oil.

Higher ceilings would not bring about a significant increase in production, PAD told the Office of Price Stabilization. At the same time, however, PAD recommended that prices for crude oils produced in California be increased. *(See West Coast).*

PAD pointed out that present production of Pennsylvania crude is 54,000 bbl. daily, which is only 6,000 bbl. below the maximum production in recent years.

While there is a shortage of Pennsylvania crude in the Pennsylvania-New York area which necessitates the use of Mid-Continent oil, a higher ceiling would not increase output significantly.

However, it was added, the current price ceiling for Pennsylvania crude tends to make such production uneconomic and has deterred additional production by substantially lessening the drilling of new wells.

PAD's position was based primarily on the fact there is no current shortage of lubricating oil and national-security needs do not require increased production. Domestic lube-oil refineries are operating below capacity because of inadequate demand, it said.

CANADA

Discovery Classed as Major

CALGARY, Alta. — Amerada Petroleum Corp.'s isolated Sturgeon Lake discovery is being hailed as the most important oil prospect to date in Alberta's Peace River region.

On final test Amerada's 33-32 Crown-O. F. recovered 2,250 ft. of oil plus 4,328 ft. of salt water. The company presently is completing the Sturgeon Lake discovery at total depth of 9,015 ft.

The new discovery is located about 45 miles south of Imperial Oil's Devonian reef oil discovery made in 1949. That new pool has to date failed to increase in size. The largest reef oil field in Canada is 180 miles southeast of Sturgeon Lake.

Amerada's significant discovery at Sturgeon Lake is expected to increase exploratory interest in the vast area, where operations have been at a minimum due to the high prospecting costs.

Union Plans Storage Line

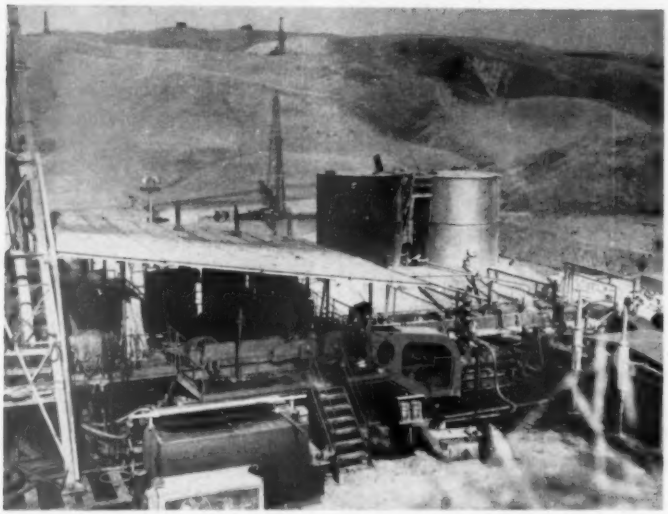
CHATHAM, Ont.—Union Gas Co. of Canada, Ltd., will lay a 40-mile pipe line between its Dawn storage field in Lambton County and Komoka, west of London, at an estimated cost of $1,000,000.

The line will link shorter stretches totaling 16 miles east of Dawn and west of London. Contract has been let to F. E. Shaw, Ltd., of Sarnia.

Drilling Still Under Par

EDMONTON, Alta. — Due to the crippling effect of the recently concluded United States steel strike, no full-scale resumption of drilling activities in Alberta is foreseen for about 2 months, drilling company officials here have stated.

They estimated that the strike curtailed drilling activity by approximately 30 per cent.



HIGH ON THE WEST FLANK of Wheeler Ridge, Richfield Oil Corp. last week completed this 1,000-ft. southwest extension to the 10,000-ft. Eocene sand pool discovered earlier this year. Across the ravine Richfield had a southeast extension under way and in the background are two extension attempts by Standard Oil Co. of California.

Drilling Sags

Notices to drill in California fall below 1951 figures for first time this year; tubular-goods shortages blamed

D. H. Stormont

LOS ANGELES.—Drilling activity in California, which has been falling off for the past 3 months, now has slipped below the 1951 pace.

Since this year has been much more successful than 1951 insofar as finding new oil reserves is concerned, the slump generally is being attributed to shortages of tubular goods.

All year, up to mid-August, the number of permits to drill filed with the state's Division of Oil & Gas exceeded the corresponding number in 1951.

The week ended August 16 was the turning point. For the week ended August 23 the division's report showed a total of 1,620 notices for this year as compared with 1,637 in 1951.

The decline came at a time when California operators were beginning to realize the fruits of the accelerated exploratory program they have been conducting this year.

Major discoveries . . . Recent discoveries by Richfield Oil Corp. in Eocene and Miocene sands at Wheeler Ridge, southeast San Joaquin Valley, and by Union Oil Co. in deep Sespe sands at Torrey Canyon in Santa Clara Valley are thought to be of major importance. Many other new discoveries have been recorded in the past 3 months, but these two finds probably will be the highlights of 1952.

From the standpoint of records the Union discovery at Torrey Canyon, where it owns 30,000 acres in fee, is particularly interesting. Its 84 Torrey was completed as a 900-ft. northeast offset to the discovery, flowing 350 bbl. of 19°-gravity crude daily. It currently is pumping 550 bbl. daily.

The well set new California records for the thickness of Sespe sand found and for the length of perforated pipe hung in a well—2,591 ft. The well was still in Sespe sand when drilling was halted at 9,944 ft., after coring a net total of approximately 1,000 ft. of sand.

Core analyses reportedly show the sand will yield from 100 to 200 bbl. per acre foot. Based on 10-acre spacing, the recovery per well might well be between 1,000,000 and 2,000,000 bbl. Based on past performance of Sespe sand producers, these new wells probably will be producing well after the turn of the twenty-first century.

About 2½ miles northeast of this activity, Union also has a Miocene sand development under way. Found in the discovery at 2,850 to 3,300 ft., this is the westernmost Miocene production in the valley. While the discovery well was Union 2-10 Oakridge, the test which first found the zone was its 1-3 Oakridge. This wildcat passed up the shallow pay and last week was drilling at about 9,000 ft. It is expected the test will go to 11,000 or 12,000 ft.

At Wheeler Ridge, Richfield last week completed its second well in the deep Eocene sand. A southwest offset to the discovery, 76-29 Kern County Land, was drilled in for 1,900 bbl. daily through 24/64-in. choke in 142 ft. of sand at 10,060-10,202 ft.

It found the sand about 180 ft. lower than in the discovery. Neither well was taken to water because of the extremely high pressures encountered.

The shallower Miocene sand encountered at 6,260-6,475 ft. in 76-29 K.C.L., which tested at the daily rate of 1,100 bbl., will be developed at a later date, a Richfield announcement said.

Since the Eocene discovery in April, Richfield has acquired 50,000 acres in the Temblor Hills to the northwest. It holds 2,700 acres in the immediate vicinity of the development, principally on lands of Kern County Land Co.

Gas Demand in '70

Doerr tells P.C.G.A. it may triple in California

LOS ANGELES. — Consumption of natural gas in California, which has tripled in the last decade to 665 billion cubic feet, is expected to climb to between 1,000 and 2,000 billion cubic feet by 1970.

This forecast for the West Coast natural-gas industry was made by O. R. Doerr, vice president of Pacific Gas & Electric Co., at the fifty-ninth annual convention of the Pacific Coast Gas Association held here last week.

Doerr pointed out that, during the 1941-51 period, sales of natural gas increased at an average rate of 11.3 per cent annually. If a 6 per cent per annum rate of increase is projected to 1970, he said, annual sales would be about 2,000 billion cubic feet. However, because of the anticipated limited supplies, the annual rate of increase in sales may be only 2 per cent. Even at this figure, sales would be about 1,000

billion cubic feet by 1970, Doerr said.

Supply picture black . . . Primarily because of the tremendous demand potential, he said, the future supply picture looks anything but bright. California was self-sufficient in 1941, but by last year out-of-state gas (mostly from Texas) accounted for 37 per cent of the total sold in California.

Doerr forecast a population growth of 33 per cent by 1960, which would bring the number of residents in the state to about 14,100,000. The number of homes, he said, should reach 4,520,000, of which 4,133,000 would be gas customers using it at the rate of 90,000 cu. ft. per customer each year.

Retiring President W. M. Jacobs, vice president of Southern California Gas Co., said the West Coast is experiencing an expansion the like of which mankind has never seen. If the industry is to keep abreast, he said, there will be a need "for careful planning, vigorous promotion, and aggressive production."

New officers . . . New officers installed during the 3-day meeting were James S. Moulton, vice president of Pacific Gas & Electric Co., president; W. C. Mainwaring, of British Columbia Electric Co., vice president; and Harry McGann, P. G. & E.,, treasurer. Directors elected and reelected included A. R. Bailey of Coast Counties Gas & Electric Co., and F. B. Wright of Southern Counties Gas Co.

Price Hike Favored

PAD's approval of proposed price increase for California crude seen as bringing independents' efforts nearer goal

LOS ANGELES.—Announcement by the Petroleum Administration for Defense that it favored an increase in the ceiling prices of California crudes bring the West Coast industry's efforts a step nearer realization.

PAD's stand was contained in recent letters to the Office of Price Stabilization, and primarily was in connection with an application filed by a group of West Coast independent producers. Late last April this group, headed by W. H. Geis of Los Angeles, asked for a 70-cent increase in crude below 10° gravity, with the amount of increase declining to 3 cents per barrel for crude over 31°.

This was the second of three such applications filed with the Office of Price Stabilization this year. Union Oil Co. in March asked for an across-the-board raise of 60 cents per barrel, with a compensating increase in prices of refined products. The request was turned down insofar as crude prices was concerned, but no decision was made on the proposed product price increase. A review of the crude-price-increase application currently is being made by OPS.

Third application filed was by Standard Oil Co. of California August 18. Its petition was for an increase in crude-oil ceiling prices ranging from 10 cents per barrel for 14° gravity and below to a maximum of 50 cents for 35° and lighter.

Concurrent raises in natural gasoline and refined product prices also were asked. These were 1.2 cents per gallon for light products, 1.4 cents for kerosine and light fuels, and 10 cents per barrel for residual fuels.

In a July 30 letter to OPS, PAD stated higher crude-oil prices would tend to alleviate the shortage of crude oil on the West Coast by offering an added incentive to producers to drill more exploratory wells.

That PAD favors a general crude-price raise was shown by its statement that, "to be effective, such an increase in ceiling prices must be applicable to all California crudes and an increased price for heavy crudes alone is not justified."

Latest application . . . Standard said a serious petroleum shortage exists in markets served by California fields. This shortage, it declared, jeopardizes the most important source of fuel for military and defense activities in the Pacific area. Cause of this shortage is inadequate ceiling prices, it stated, adding:

"The present levels of California crude oil prices are inadequate because they neither (a) encourage sufficient exploratory, development, and secondary-recovery activity to permit total District 5 producibility to keep up with total petroleum demands upon the district nor (b) reflect the dependency of District 5 upon other areas for a significant portion of its petroleum supplies.

"The present prices were adequate when established in 1949 and 1950 because at that time District 5 demands could be satisfied by California and drafts upon District 5 stocks. Since then, however, District 5 has reached a point at which California production at present price levels is not sufficient to satisfy the district's demands, and further significant stock drafts are impossible.

"Therefore, District 5 petroleum prices must rise enough either to stimulate California production or attract from other areas the volume of petroleum necessary to meet the essential civilian and military demands of the district."

Deficit estimate . . . If the entire military demand for the Pacific is to be supplied by California fields, it was estimated, there will be a deficit of 57,000 bbl. daily in local supply this year. During 1953 it was estimated this deficit would rise to 62,000 bbl. daily.

In discussing the effect of the proposed price increase upon the District 5 shortage, the application stated additional supplies from non-California sources would be attracted. In addition, "a higher level of California crude-oil prices will increase exploration, development, and secondary-recovery activities in District 5."

"New exploration and secondary recovery probably could not produce additional oil rapidly enough to ease the immediate shortage problem, but rapid development of proved and semi-proved areas now considered marginal is possible and probable if prices are increased sufficiently."

ROCKY MOUNTAIN

Locations at New Peak

DENVER. — Another new record was announced last week for wildcat locations in the Denver-Julesburg basin.

Sixteen new locations were reported. They were scattered from the southern portion of the basin in Pueblo County, Colorado, to the Chadron Arch area of Central Nebraska.

In Nebraska, The Chicago Corp. and Republic Natural Gas Corp. have completed 1 Wood, a "J" sand gas discovery in the southeast Sidney area, Cheyenne County.

Colorado's portion of the basin chalked up a new completion at Kimbark Co.'s 1 Ward in Washington County. This new discovery was completed for 35 bbl. of oil daily.

Severance Tax to a Vote

DENVER. — Colorado's proposed oil-and-gas severance tax will go before the voters in the November general election.

The Supreme Court of Colorado said this, in effect, when it recently upheld a ruling of Denver District Judge E. C. Day, who held unconstitutional a legislative act requiring referendum petitions

to be filed 8 months before the election.

The court said the act would have limited seriously the "people's right to initiate measures outside the state assembly."

The proposed tax would rake in 5 per cent of all income from oil and gas production. The proceeds would be earmarked for the state schools. The tax proposal will be presented to the voters in the form of a constitutional amendment.

The court ruled only on the constitutionality of the act. The validity of the 41,000 signatures on the petition for the amendment vote still may be questioned.

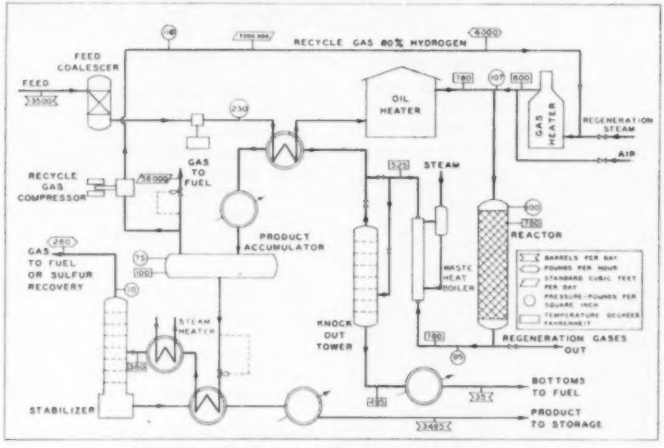
Texaco Confirms Discovery

DENVER.—The Texas Co. has confirmed its recent lower Amsden strike in the northwestern Sumatra area of Rosebud County, Montana, opening up what appears to be a significant pool.

The discovery is considered the major development in recent months in the area of Montana outside the Williston basin.

The confirmation well, 2 Grebe, flowed at a rate of 750-1,000 bbl. of oil per day in a 20-minute drill-stem test from 4,708-46 ft. It is ½ mile southeast of 1 Grebe, which was brought in for 283 bbl. of oil daily.

TECHNOLOGY



FLOW DIAGRAM of Anglo-Iranian's Autofining process.

"Autofining" Explained

New process, now being applied commercially for the first time, can be used to desulfurize sour-distillate fractions

NEW YORK. — Sour - distillate fractions including light diesel fuels can be successfully desulfurized in the new catalytic "Autofining" process.

Developed by Anglo-Iranian Oil Co., the process now is undergoing its initial commercial application in a 3,500-bbl. unit at the company's refinery at Llandarcy, Wales. Having proved the process commercially, the company has released further details on its operation.

Although the Llandarcy unit is being used in blocked operation on solvent naphthas and power kerosines, it is capable of desulfurizing a fairly wide range of distillate stocks. These include straightrun gasoline, naphthas, kerosines, gas oils and light diesel fuels, and aromatic extracts and solvent naphthas. Substantially complete sulfur removal is reported possible on straightrun feed stocks up to 500° F. end point and on aromatic extracts up to 300° F. end point. About 70 per cent desulfurization can be obtained on heavy aromatic extracts to 500° F. and on 700° F. end-point gas oils.

Motor fuels show an octane improvement of 2 to 3 numbers and greatly increased lead susceptibility. Pilot-plant runs on numerous types of feed were reported in *The Oil and Gas Journal, March 17, 1952, page 169).*

Fixed-bed process . . . The Autofining process operates on the fixed-bed principle. Vaporized charge together with heated recycle gas pass downward through the single catalyst bed, as shown in the accompanying flow chart. Reacted vapors generate steam in a waste-heat boiler before partial condensation and separation in a product accumulator. A knockout tower is provided for removal of heavy ends from kerosines when processing for color specifications.

The recycle compressor takes suction on vapors from the accumulator, compressing the high-hydrogen-content gas for return to the reactor at 100 psi. Excess recycle gas is withdrawn from the system for plant-fuel makeup.

Liquid product is flashed to a stabilizer for removal of light gases, including hydrogen sulfide. Stabilized product, although normally free of hydrogen sulfide may be given a light caustic wash as a precaution against incomplete stabilization.

Catalytic reactions . . . The catalytic reactions principally constitute the conversion of sulfur compounds to hydrogen sulfide, and the dehydrogenation of cyclic hydrocarbons. Dehydrogenation is sufficient to provide the hydrogen necessary for combination with sulfur.

Hydrogen sulfide content in recycle gas is permitted to build up until equilibrium is reached with the liquid product in the accumulator. New production of hydrogen sulfide then is removed from the system in the stabilizer overhead. Anglo-Iranian spokesmen say that excess gas production is small and little or no change takes place in the boiling range of processed stocks.

Rugged catalyst . . . The granular catalyst (2 to 4 mesh) shows good physical properties. In the 330-bbl. pilot plant at Grangemouth refinery, the catalyst by last May had lived more than 19 months with 90 regenerations.

The catalyst is regenerated readily to full activity by circulating air diluted with either steam or an inert gas. On-stream periods in excess of 1,000 hours are possible when processing lighter feed stocks with end points up to 500° F., and the catalyst generally is regenerated after 200 hours.

The catalytic reactions are essentially thermoneutral, say Anglo-Iranian engineers. Reactor temperatures range from 750° to 800° F., and pressure may be varied between 100 and 200 psig.

Space velocity represents the most important process variable and is dependent on feed - stock characteristics and desired degree of sulfur removal. For most of the light feeds, a space velocity of 3 to 5 volumes of gas per volume of reactor has been found sufficient, while 1 to 2 v/v/hour may be required for gas oils.

Spraberry Prospects

Study by two engineers indicates average 40-acre well just completed will be short lived, will lose $11,000

MIDLAND, Tex. — Low recoveries and short producing life typify the average Spraberry well, according to present conclusions of petroleum engineers.

Two oil company engineers here recently completed an economic study which revealed that the average Spraberry well, drilled on a 40-acre spacing pattern, will recover by primary methods 24,000 bbl. of oil; the producing life of the well will be only 1 to 1½ years.

The study also indicated that wider spacing is mandatory if economic development of the Spraberry trend is to continue. In the study, which was based on their personal experience, the Midland engineers analyzed a case of "hypothetical production versus income from a Spraberry well completed August 1, 1952."

The study breaks down out-of-pocket expenditure and total income as follows:

	First year	Second year
Out-of-pocket expenditure:		
Intangible costs	$62,000	None
Tangible costs	28,000	None
Total	$90,000	None
Total income:		
Working interest in production (7/8) in bbl.	$18,700	$2,700
Value of working interest production at $2.65 per bbl.	49,600	7,160
Field operating cost at $4.00 per day	1,460	923
Production and property taxes at 15 cents per bbl.	2,810	405
Income tax computation:		
Intangible costs	$62,000	.....
Depreciation at 10 per cent per year	2,800	$2,800
Cost depletion	7,650	1,103
Taxable income	27,120	1,929
Income tax (52 per cent)	14,100	1,003
Net cash earnings for payout:		
Year	$59,430	$4,829
Cumulative to end of year	59,430	11,471
Salvage value of equipment at 50 per cent		$14,000
Total income		78,259
Net loss per well		11,741

Assumption cited . . . The above study is based on the following assumptions:

. . . Allowable production rate sustained for 4 months at 83 bbl. per calendar day.

. . . Decline rate of 7½ per cent for the fifth month and 15 per cent for each month thereafter to the economic limit at the end of 20 months for a cumulative production of the order of 24,000 bbl. per well.

. . . Cost depletion based on a lease cost of $250 per acre and 40 acres per well.

. . . Income tax based on a corporate structure whereas the tax credit of $14,100 can be deducted from taxable income and is therefore for these purposes included as net income to the well.

Drilling costs . . . In connection with this study, a breakdown of the cost of drilling a recently completed 7,381-ft. Spraberry well is presented here:

Intangibles:	
Payroll expense	$16,000
Materials	3,100
Fuel	3,000
Drilling fluid	6,200
Rig move	4,100
Cementing	3,000
Testing	1,600
Completing and surveying	4,600
Bits and reamers	8,800
Tool rentals	575
Hauling	2,758
Drilling rig upkeep	8,400
Total intangibles	$62,133
Tangibles:	
Casing	$21,000
Tubing	3,600
Well-head equipment	3,770
Total tangibles	$28,370
Total cost	$90,503

The cost per foot of putting this well in the tank was $12.26. A total of 126 tons of steel was used.

Pilot Flood Proposed

AUSTIN.—A pilot water-injection program for Salt Creek Canyon Reef field of Kent County, West Texas, has been submitted to the Texas Railroad Commission by General Crude Oil Co.

The field now has a gas-injection program in operation, returning between 95 and 98 per cent of all gas produced to the reservoir. Gas injection, however, has not prevented a decline in reservoir pressure. This continued drop led to the water-flood proposal.

Salt Creek field has 105 producing oil wells on about 8,000 acres. Reservoir pressure has declined 650 psi. to a current pressure of 2,290 psi.

Water for SACROC

Work progresses on dam to supply Canyon Reef flood

SNYDER, Tex. — The earth-work phase of the water-supply dam under construction on the Colorado River in southwest Scurry County, West Texas, was completed near here last week.

Water to "sweep" the Canyon reef reservoir in the Diamond M and Kelly-Snyder fields from strategically located water-injection wells will be made available to the unit proposed by the Scurry Area Canyon Reef Operators Committee this month from the Colorado River Municipal Water District supply dam and reservoir.

Freese & Nichols, Fort Worth, consulting engineers for the water district project, estimate that a sufficient volume of water will be impounded by the dam by January 1, 1953, to supply all necessary water-injection requirements of SACROC.

Water-line finished . . . From the dam, a 27-in. water line has been completed to Kelly-Snyder field, where it joins an old 21-in. line extending east to Snyder. In addition to furnishing water for oilfield injection, the line will continue to furnish water for commercial and domestic purposes at Snyder.

Lease operators in the proposed SACROC unit underwrote and have paid for the extra facilities of the water line incident to repressuring operations. This included the laying of larger-diameter pipe (27-in. instead of 21-in.) and the additional line made necessary by rerouting the line so as to pass through the Diamond M and Kelly-Snyder fields. The original 21-in. water line will be abandoned, except for the easternmost segment.

New Deep Producer

MIDLAND, Tex.—Phillips Petroleum Co.'s 1 Glenna in Pecos County, Texas, has cracked the record for deep production in the Permian basin.

The Phillips completion wipes out the

former deep-production mark set earlier this year by Magnolia Petroleum Co.'s 1 University in Andrews County. The 1 Glenna came in for 12,260 M.c.f. of gas daily plus 3.8 bbl. of high-gravity distillate from perforations in the Ellenburger at 13,700-13,835 ft., 14,090-14,285 ft., 14,400-60 ft., and 14,485-14,522 ft., total depth.

Magnolia's 1 Andrews is producing from the Ellenburger at 13,840-84 ft.

The Glenna discovery is located in an area in which the deeper horizons are relatively unexplored. It is in the Sheffield Channel, a seaway between the Midland and Delaware basins during Permian and pre-Permian ages. *(The Oil and Gas Journal, May 5, 1952, page 160).*

San Juan Gets Contract

DALLAS.—San Juan Oil Co. has contracted to operate 17 oil and gas wells in Joyce Richardson and Refugio-Heard fields and a natural-gasoline plant at Refugio-Heard field for Reiter-Foster Oil Corp., New York. Reiter-Foster recently acquired the properties formerly operated by Federal Oil & Gas Industries, Inc., and Bennett Oil & Refining Co.

ECONOMICS

Distillate Problem

East Coast faces a 45,000-bbl. daily shortage, even with a normal winter, unless output is increased, PAD cautions

WASHINGTON. — A 45,000-bbl. a day shortage of distillate faces the East Coast this winter unless East Coast and Gulf refiners further step up their yields of kerosine, home heating oil, and diesel fuel, the Petroleum Administration for Defense believes.

In an appeal to refiners to take the necessary steps to meet the situation, PAD officials said their estimate of the shortage is based on the hope of a "normal" winter. They refused to hazard a guess of what the shortage might be if more severe weather occurred.

A PAD survey of refiners' programs in Districts 1 and 3 showed that they plan to increase crude runs to 3,832,000 bbl. daily for the July 1, 1952-March 31, 1953, period from 3,573,000 bbl. daily a year ago. They plan to increase the yield of middle distillate from 30.03 to 30.66 per cent, giving them an output of 1,175,000 bbl. daily against 1,073,000 bbl. daily.

This yield, however, will not be sufficient, it was declared by Deputy Administrator J. Ed Warren, and must be increased to 1,220,000 bbl. daily, or 31.84 per cent, if East Coast minimum requirements are to be met.

Over the past 2 months, PAD officials held conferences with individual suppliers in Houston, and New York, stressing the need for maximum production of distillate.

East Coast distillate demand is expected to total about 280,000,000 bbl. during the heating season, and a shortage of about 12,000,000 bbl.—45,000 bbl. a day—would be "extremely serious," Warren declared.

The only bright spot in the situation, Warren said, is the distillate in primary storage in District 1—48,000,000 bbl. on August 16, or about 4,000,000 more than on the same date last year. Stocks in District 3, however, are still below last year.

Movement slow . . . Warren warned that the East Coast figures may be deceptive, explaining that one of the reasons for the improvement in primary stocks apparently is that products are not moving at a normal rate from refineries and terminals to secondary suppliers and consumers following a period of accelerated buying during the early summer.

"In any event," Warren said "the petroleum industry faces a difficult supply problem in meeting next winter's distillate demands on the East Coast. About 2 months from now, demand for middle-of-the-barrel products will begin to rise precipitously. Assuming normal weather, PAD estimates that middle-distillate consumption in Districts 1 and 3 during the first quarter of 1953 will average about 850,000 bbl. a day above the level during the third quarter of 1952."

Exports Drop Sharply

WASHINGTON.—Exports of major products averaged 170,500 bbl. daily during the week ended August 8, a sharp decline from the record 335,200 bbl. of the preceding week.

The Petroleum Administration for Defense said the slump occurred in all five products.

Details of the shipments for the week, compared with the week ended August 1, and averages for the 4 weeks ended August 8 are shown in the accompanying table in thousands of barrels daily.

	Week ended— Aug. 8	Aug. 1	4 weeks Aug. 8
Aviation gasoline	52.5	67.8	43.2
Motor gasoline	10.3	32.4	15.4
Kerosine	13.5	41.8	17.1
Distillate	41.3	105.5	84.5
Residual	52.9	87.7	68.2
Total	170.5	335.2	228.4

Diesel Sales Gain

Sharp jump in 1951 shown in Bureau of Mines Report

DIESEL fuels represented 27.1 per cent of all distillate sales in this country for 1951, according to the annual survey of fuel oil sales made by the Bureau of Mines.

Total sales of diesel fuels in 1951 amounted to 121,622,000 bbl. for a gain of 16.1 per cent over 1950. Sales of other distillates increased 12.6 per cent.

More diesel fuel was marketed in California than in any other state. California's diesel sales reached 15,952,000 bbl. last year, or 13.1 per cent of all the diesel fuel sold in the United States.

The decided trend toward the use of diesel fuel by the railroads on the West Coast, combined with the increased use in recent years for truck and bus fuel, has made diesel fuel an important item for the refineries in California. Diesel-type fuels represent 72.4 per cent of total distillate sales in California.

For the country as a whole, railroad purchases of distillate fuels, mostly diesel grades, exceeded purchases of residual fuel in 1951 for the first time. Railroad purchases of distillates increased 23.1 per cent in 1951 and accounted for 13.4 per cent of all sales of distillate fuels.

Sales of distillate fuels for space heating represented 55.5 per cent of total distillate sales in 1951 compared with 55.9 per cent in 1950 and 71.9 per cent in 1940.

Residual-oil sales were up only 1.7 per cent for the year. Decreases in sales to railroads and to gas and electric power plants were only slightly less than increases in purchases under all other classifications. Important gains were reported for vessel bunkering, industrial use, and military purchases.

Kerosine sold as range oil increased 8.5 per cent, but decreases in consumption as tractor fuel and all other uses reduced the over-all gain to 4.2 per cent.

More than 93 per cent of the kerosine and No. 1 fuel, marketed as range oil, was delivered in Districts 1 and 2.

Dual-Zone Protest

Compact asks states to take critical view of applications for multiple completions of wells; study to be continued

Henry D. Ralph

BANFF, Alta.—A recommendation that states not permit multiple well completions except under special circumstances was made to the Interstate Oil Compact Commission by its research and coordinating committee following a study which has been under way for more than a year.

As a means of saving steel, regulatory commissions have been under pressure to permit more wells to be completed in two or more producing zones, but the committee concluded that this advantage may often be offset by serious disadvantages.

It pointed out that under some conditions the fluids of the two zones may become mixed, causing damage to the reservoir, corrosion, or premature abandonment and that multiple completions create serious problems of pumping and working over a well.

Opinion varies . . . The recommendation was based on a survey of industry practice and experience made at the committees request by Sinclair Oil & Gas Co.

This survey revealed a wide difference of opinion as to the desirability of dual completions, with some companies reporting very little difficulty and others telling of unfortunate experiences.

Because of this, the committee report said "It does not recommend at this time that state regulatory agencies should permit blanket authorization of multiple completions. However, the committee does recognize the practicality and useful purpose that this type of completion can afford in individual cases and suggests that multiple completions be authorized where the facts justify it."

Where economic conditions prevail making it impossible for twin wells to be drilled because of materials shortages, multiple completion should be permitted, it said, but only after a complete investigation to determine that it is acceptable and will not cause waste.

The committee recommended against multiple completions in two oil reservoirs of similar character and pressure as it is almost impossible to be certain that a satisfactory separation has been accomplished by means of a packer. Where the reservoirs are of different character or contain different types of fluids, it explained, checks may be made to determine that no migration or communication exists between the reservoirs.

Undesirable cases . . . Among the conditions which make multiple completions undesirable the committee listed:

. . . Where the energy present to move the fluid through the reservoir and lift it to the surface is such that it is now or would soon be necessary to artificially lift the fluid, thus causing premature abandonment.

. . . Reservoirs of the character that might require numerous workovers.

. . . Where reservoirs contain fluid of a corrosive nature sufficient to create a hazard.

. . . Reservoirs which contain paraffin, water, or sand in sufficient quantities to require frequent maintenance and workover operations.

Plugging suggestion . . . In another action affecting oil operations the regulatory practices committee adopted a preliminary report suggesting that when a well is abandoned it be plugged with cement plugs set through all permeable zones carrying fluids with mud to the bottom of the surface pipe, where another cement plug is to be set, then a column of mud to the surface, and a top cement plug with marker.

This is the requirement recently put into effect by the Colorado Oil and Gas Conservation Commission after a survey of practices in that state.

Many operators argued that a column of heavy mud, with cement plugs at bottom and top of the surface pipe is sufficient, but the Colorado commission concluded that this is unsatisfactory.

The Compact committee will continue its study of plugging practices and will make a more detailed report at a later meeting.

Compact Criticizes FPC

Federal agency is primarily interested in gaining more "unlawful" power rather than in saving gas, group says

BANFF, Alta.—A strong resolution condemning the Federal Power Commission for its "new studied effort to extend its jurisdiction into fields prohibited to it by the congress in the natural gas act" was adopted by the Interstate Oil Compact Commission.

The resolution specifically criticized the action of the majority of FPC in its recent decision in refusing to allow Northern Natural Gas Co. to include in its rate base the 8-cent minimum price specified by the Kansas Corporation Commission for gas produced from Hugoton field.

The resolution said the compact: "Further condemns and disapproves of the shortsighted policy of the majority of FPC in refusing to recognize the local as well as the distant interest in the conservation of natural gas, it being in the national interest to conserve to its maximum degree this irreplaceable superior fuel.

"We call upon the Federal Power Commission in the national interest to cease their constant quest for additional unlawful power and to cooperate with state authorities in effective local conservation of natural resources."

"Illegal" power . . . The FPC, the resolution declared, heretofore has been on both sides and in the middle of jurisdictional questions, causing great confusion in the several gas-producing states, and recent decisions clearly indicate a renewed effort to usurp jurisdiction reserved to the states.

Adoption of the resolution followed a bitter attack on the FPC's decision in the Northern Natural case delivered before the legal committee by Jay Kyle, general counsel of the Kansas Corporation Commission.

The Kansas price order was clearly outside the FPC's specified jurisdiction, Kyle said, because it deals with production and gathering of gas and because it is purely a conservation measure, recognized as such by the courts.

He charged that FPC ignored testimony in its hearings showing that the

Gas Engineers Finish Summer School

These 23 gas-company engineers and two faculty members are shown as they wound up the first summer refresher course in gas engineering conducted by the Institute of Gas Technology, which is affiliated with the Illinois Institute of Technology, Chicago. The 6-week course was designed to familiarize gas engineers with current problems and practices. Instruction in research and measurement and computation methods was at the graduate level. Left to right in the group are, front row: H. M. Boyer, Southern California Gas Co.; J. F. Schuldt, Peoples Gas Light & Coke Co.; R. E. Bayne, Hope Natural Gas Co.; J. D. Parent, dean; E. S. Pettyjohn, director; W. G. Hulbert and C. E. Campbell, East Ohio Gas Co.; and E. A. Skibinski, Rochester Gas & Electric Co. Second row, W. P. Blake, Minneapolis Gas Co.; J. M. Atkinson, Peoples Gas Light & Coke Co.; E. V. Fisher, Ford, Bacon & Davis Construction Corp., Inc.; R. V. Burnette, Rockwell Manufacturing Co.; E. B. Hedges, Michigan Gas Storage Co.; C. F. Boekell, Hope Natural Gas Co.; P. S. Magruder, Jr., Southern California Gas Co.; and H. G. Kaess, Minneapolis Gas Co. Back row: E. C. Rowan, Ford, Bacon & Davis Construction Corp., Inc.; B. L. Gregorowicz, Inland Steel Co.; F. L. Bennett, Seattle Gas Co.; J. M. Phillips, Southern Natural Gas Co.; D. T. Strieff, Public Service Co. of Northern Illinois; R. A. Johnson, Rockwell Manufacturing Co.; O. G. Bryant, Houston Natural Gas Co.; R. T. Miller, Portland Gas & Coke Co.; and J. F. Gary, Seattle Gas Co.

order is not price fixing but that a minimum and uniform well-head price is essential to conservation. "Essentially what the majority opinion said," Kyle declared, "is that perhaps it is all right for the states that produce natural gas to practice conservation as long as the gas remains in their own states but when that gas crosses a state line, state conservation practices then are idle gestures."

Kyle announced that the FPC order will be appealed to the Federal Circuit Court in the very near future.

Compact Lauded

Chapman even encourages market-demand proration

BANFF, Alta.—Full endorsement of conservation work and oil and gas regulation by the states was expressed to the Interstate Oil Compact Commission at its fall meeting here by Oscar L. Chapman, secretary of the Interior.

The secretary particularly endorsed state action in setting allowables at market demand and said that other states will have to come to the same program.

This position was considered noteworthy by many of the state officials in view of the recent Federal Trade Commission report on oil cartels which criticized market-demand proration as a monopolistic price-fixing measure. Chapman was not able to be present in person and his address was read by J. Ed Warren, deputy petroleum administrator for defense.

No federal job . . . Without equivocation, Chapman's speech supported the principles of conservation and state action which constitute the program of the Compact commission.

Chapman said: "The positive aspects of conservation come in the technological advances that let us get more and more out of the resources with which we have been endowed. . .

"We in Washington became aware, as we had to, that this job of conservation was not one the federal authority could do by itself. It calls for cooperation within reasonable limits in the industry, between the industry and the states, between the states and the federal Government. It calls for competition within the industry to insure that technical development that springs naturally from the proper struggle for economic advance will continue."

Oil Found in Hugoton

WICHITA. — First oil production within the confines of the vast, three-state Hugoton gas area is being opened in southern Finney County, Kansas.

The discovery well, drilled by W. J. Coppinger of Wichita as 1 Beyer and now being put on the pump for completion, produced at the rate of 30 bbl. of oil per hour during an 8-hour swabbing test.

Pay zone is in the Pennsylvanian Marmaton lime, casing is perforated at 4,398-4,406 ft.

The well, one of the few tests ever drilled below the Permian gas producing zones of Hugoton field, is expected to inspire more widespread exploration of the deeper zone potentialities of that field. Its location, in the SE SE NW 24-26-33, 12 miles south of Garden City, on the east side of the gas area, is more than 25 miles from nearest other oil production.

Industry Briefs

WASHINGTON. — The Office of Price Stabilization last week rejected another petition by producers in Woodlawn gas field of Harrison County, Texas, for a ceiling price of 12 cents per M.c.f. at the well head. Ellis Arnall, outgoing price chief, signed the rejection order as one of his last official acts. At the same time it was revealed that an OPS review board recommended that a new ceiling price of 11.5 cents per M.c.f. be set.

BATON ROUGE.—Louisiana's Department of Conservation has set the state's daily oil-production allowable for September at 679,206 bbl.—up 8,394 bbl. daily over July. South Louisiana's share will be 562,232 bbl. daily, North Louisiana's 116,232 bbl. daily.

WICHITA.—The Kansas State Corporation Commission has set a record oil-production allowable for the state of 330,000 bbl. for September. The figure is 10,000 bbl. daily over the August allowable.

A.S.M.E. Conference

All-technical program set for engineering meeting

KANSAS CITY. — Technical papers on current problems of operating men of the oil industry will fill most of the sessions during the 3 days of the seventh annual petroleum mechanical engineering conference of the American Society of Mechanical Engineers.

The conference will be held in the President Hotel here September 22-24.

R. J. S. Pigott, A.S.M.E. president and chief engineer of Gulf Research & Development Co., Pittsburgh, will address the annual banquet September 23.

Papers to be presented at the conference follow:

SEPTEMBER 22

Morning

Control and Instrumentation . . . "Practical Considerations Regarding Pipe Line Control Valve Design," Charles F. Woods, Minneapolis-Honeywell Regulator Co., Dallas; "Instrument Application in the Product Pipe Line Industry," Harold R. Hoyt, Great Lakes Pipe Line Co., Kansas City.

Tubular goods and cementing . . . "Various Methods of High Pressure Testing Oil Comtry Tubular Material," H. G. Texter, Spang-Chalfant Division of National Supply Co., Tulsa; "American Oil Well Cementing Practice," Charles W. Schoenfeld, Bullard Co., Brideport, Conn.

Refinery design . . . "Orthoflow Fluid Catalytic Cracking Units, Their Design and Operation," W. J. Degnan, M. W. Kellogg Co., New York; "Mechanical Design Features of the Cycloversion Process," Kenneth W. Seed, Phillips Petroleum Co., Bartlesville, Okla.; "Ammonium Sulfate From Refinery Waste," E. D. Fox, Fluor Corp., Los Angeles.

Afternoon

Panel discussion . . . "Compressors in Gas Pipe Line Service—Design, Station Construction, Economics, and Operating Experience." Participants will include A. N. Sarch, De Laval Steam Turbine Co., Houston; H. L. Norris, Jr., Fish Engineering Corp., Houston; J. F. Eichelmann, El Paso Natural Gas Co., El Paso; D. R. Croft, Transcontinental Gas Pipe Line Co., Houston; C. W. Marvin, Texas Eastern Transmission Corp., Shreveport; and W. H. Stueve, consultant, Oklahoma City.

Shale-Oil Developments . . . "Offsite Facilities of an Oil Shale Industry," W. F. Stone, U. S. Bureau of Mines, Rifle, Colo.; "Mechanical Design in Oil Shale Retorting Plants," L. H. Brakel, Bureau of Mines, Rifle; "Engineering Features of the Union Oil Shale Retort," Homer C. Reed, Union Oil Co., Los Angeles.

Pumping problems . . . "Reda Pumping of Wells," J. F. Boutwell, Reda Pump Co., Bartlesville, Okla.; "Mechanical Aspects of Sucker Rod Pumps," Ralph R. Renouf, Service Engineering Enterprises, Inc., Tulsa; "Electrical Analog Possibilities in Sucker Rod Pumping Problems," E. N. Kemler, R. J. Howe, and Chang K. Tsai, University of Minnesota, Minneapolis.

SEPTEMBER 23

Morning

Pipe-Line Valves . . . "Synthetic Rubber-Sealed Biway Gate Valve," H. G. Smith and H. G. Doster, Ohio Injector Co., Wadsworth, Ohio; "Mechanical Development of a Non-lubricated Lift-Plug Valve," R. C. Brooks, Cameron Iron Works, Inc., Houston; "Remote Electric Valve Operation for Crude and Products Lines," H. A. Altorfer, Nordstrom Valve Division of Rockwell Manufacturing Co., Oakland.

Drilling Equipment . . . "An Investigation of the Bit Forces in Rotary Drilling and Their Measurement With a Bottom-Hole Weight Indicator," Harold J. Endean and William M. Laird, Gulf Research & Development Co., Pittsburgh; "Recent Developments in Drill Bits and Drilling Methods," H. B. Woods, Hughes Tool Co., Houston.

Refinery Insulation . . . "Low Temperature Insulation for Refinery Service," W. L. Martin, Humble Oil & Refining Co., Baytown, Tex.; "Improved Methods for Fireproofing Structures," C. H. Kuhasz, M. W. Kellogg Co., New York; "New Procedures in Industrial Insulation Application," E. C. Shumen, Owens-Illinois Glass Co., Toledo, and C. J. Kuhasz, M. W. Kellogg Co., New York.

SEPTEMBER 24

Morning

Pipe-line operation and maintenance problems . . . "Crude-Oil Working Tanks—Design, Construction, Operation, and Maintenance Considerations," R. M. Carter, Service Pipe Line Co., Tulsa; "Pipe Line Scraper Development," T. D. Williamson, Jr., T. D. Williamson, Inc., Tulsa; "The Construction of High Pressure Gas Lines from the Gulf of Mexico for Inland Distribution," A. M. Croswell, Gulf Southern Contractors, Shreveport.

Design . . . "Packaged Gasoline Plants," Charles B. Barry, Blaw-Knox Co., Tulsa; "Direct Fired Heaters for Natural Gasoline Plants," Harold J. Born and George F. Rose, Born Engineering Co., Tulsa.

Materials . . . "Some Possible Application of Ductile Iron in the Petrolelm Industry," R. J. Rice, International Nickel Co., Houston; "Modern Steel Bolting for Piping and Pressure Vessels," C. M. Vogrin, M. W. Kellogg Co., New York; Frank S. G. Williams, Taylor Forge & Pipe Works, New York; and John S. Worth, Bethlehem Steel Co., Bethlehem, Pa.

Afternoon

Refinery maintenance symposium . . . "Refinery Maintenance During Operation," Claude H. Trotter, Phillips Petroleum Co., Bartlesville, Okla.; "Onstream Maintenance—What and How," J. O. Thoen, Continental Oil Co., Ponca City, Okla.; "Maintenance Work on Refining Units During Operations," W. J. Buxton, Standard Oil Co. (Ind.), Whiting, Ind.; "Tooling for Refinery Maintenance," H. S. Selindh, C. F. Braun & Co., Alhambra, Calif.

Protective treatment . . . "Full-Scale Fatigue Testing of Compressor Cylinders," T. O. Kuivinen, Cooper-Bessemer Corp., Mount Vernon, Ohio; "Preservation Treatment of Existing Cooling Towers," D. R. Baker, Marley Co., Inc., Kansas City.

Natural-Gasoline and L.P.G. Recovery and Storage . . . "The Economic Aspects of Natural Gasoline Production on the Lease," Wickliffe Skinner, Jr., Sivalls & Bryson, Inc., Oklahoma City; "Subsurface Storage of Liquid Hydrocarbons," Neal Van Fossan, Slick-Urschel Oil Co., Midland, Tex.

A.A.O.D.C. Program Set

OKLAHOMA CITY. — Frank Morgan, vice president of Richfield Oil Corp., will be the principal speaker at the twelfth annual meeting of the American Association of Oilwell Drilling Contractors.

The meeting will be held here September 29 and 30.

Morgan's address will be on the significance of geology to the drilling division of the industry.

Speaker at the annual banquet of the association will be W. C. Whaley, president of Sunray Oil Corp.

A. W. Thompson, A.A.O.D.C. president, will address the meeting September 29 in the form of a general report on the drilling industry.

Other papers will include "College Men in the Drilling Industry," W. H. Carson, dean of the college of engineering, University of Oklahoma; "Drilling With Tubing," W. F. Bates, Shell Oil Co., Los Angeles; "Application of Torque Converters and Hydraulic Couplings to Drilling Machinery," Jack N. Yetter, Twin Disc Clutch Co., Tulsa; and "Performance of High-Pressure Power Pumps," Earle C. Hellums, Cron & Gracey Corp., Houston.

N.P.A. Convenes Wednesday

ATLANTIC CITY.—A symposium on jet fuels will highlight the fiftieth annual meeting of the National Petroleum Association, to be held here September 10-12.

Participants in the symposium will include Dr. Carl W. Kelley, Munitions Board; Maurice Granville, assistant director of refining, Petroleum Administration for Defense; E. A. Droegemueller, United Aircraft Corp.; H. A. Fremont, General Electric Co.; Stanley Smith, Bendix Aviation Corp.; Dr. J. Bennett Hill, Sun Oil Co.; and W. F. Krause, Globe Oil & Refining Co.

Speakers during other sessions of the 3-day meeting will include Frank M. Porter, president of the American Petroleum Institute; R. L. Tollett, president of the Western Petroleum Refiners Association; Fayette B. Dow, N.P.A. general counsel; T. O. Yntema, financial vice president of Ford Motor Co.; Thomas F. Patton, vice president and general counsel, Republic Steel Corp., Fred Carpi, vice president in charge of traffic, Pennsylvania Railroad Co., S. F. Nines, president of Leaman Transportation Corp., and Earle M. Craig, chairman of the board of Freedom Valvoline Co., and president of N.P.A.

Drilling Rate High

Number of operating rigs abroad now at all-time record; principal gain is in Venezuela, still below 1948 peak

Dahl M. Duff

DRILLING activity in areas outside the United States and Canada is now at a record high level.

The number of rotary rigs operating abroad totals approximately 620, a figure exceeding even the previous high during the boom in 1948.

Venezuela, which accounts for some 20 per cent of the total foreign rigs running, is still below the levels of 1948, but there has been a sharp expansion in drilling in a number of other countries.

The 620 total of rigs represents a tabulation of available information in July of this year. As of mid-July, 2,445 rotary rigs were running in the United States, and 166 in Western Canada. Thus, the total of all rigs exclusive of Russia and its Communist satellites, was around 3,230 at that time.

As shown in the accompanying tabulation, there has been an increase of about 30 over the last year in the number of rigs running outside the United States and Canada. Most of these have been added in Venezuela, where drilling has been gradually increasing since the slump in 1949.

Data as of March 1948 showed a total of around 570 rigs in operation in foreign areas. Of these, 133 were in Venezuela as compared to 122 in July of this year. However, many other countries showed increased drilling activity this July in comparison with the 1948 period. These included particularly Mexico and also France, Italy, and North Africa.

Middle East unchanged . . . The number of rigs in operation in the Middle East has shown little change in the last 4 years. The total is now 37. Two rigs are reported running in Iran for the government oil companies. This is three less than a year ago, but the decline has been offset by additions of one rig each in Kuwait, Saudi Arabia, and Iraq.

The well-known high rate of productivity of wells in the Middle East is shown by the fact that these 37 rigs support an output that currently exceeds 2,200,000 bbl. daily. By contrast, 337 rigs in Latin America correspond to a production not much greater—2,330,000 bbl. daily.

Even more striking is the difference between rigs in operation and production in Europe and Africa, 178 rigs for a production which in June was slightly over 100,000 bbl. daily. More than 50 rigs are running in France and Italy which have negligible production but which are engaged in substantial exploratory programs.

On the other hand, Egypt, which accounts for nearly half the production of this geographical region, has but two repair strings running.

The figures in the tabulation are intended to show only rigs actually in operation. However, it is sometimes difficult to separate equipment temporarily stacked from that currently in use. In Alaska, in the Navy's program, three heavy rotary outfits are available, but at this time lighter portable equipment is being used.

ROTARY RIGS IN OPERATION OUTSIDE THE UNITED STATES

Country—	July 1952	June 1951
North America		
Alaska	0	2
Cuba	1	1
Mexico	80	80
	81	83
South America		
Argentina	45	45
Bolivia	2	2
Brazil	5	5
Chile	5	5
Colombia	17	15
Ecuador	11	11
Peru	22	23
Trinidad	27	26
Venezuela	122	95
(Eastern and Central)	(60)	(50)
(Western)	(62)	(45)
	256	227
Europe		
Denmark	3	3
England	8	8
France	31	30
Germany	95	90
Italy	20	20
Netherlands	4	8
Portugal	2	2
Spain	3	2
	155	163
Africa		
Algeria	5	5
Egypt	2	3
Ethiopia	1	0
French Equatorial Africa	2	2
French Morocco	5	6
Madagascar	1	0
Nigeria	1	1
Tunisia	6	3
	23	20
Middle East		
Bahrein	2	2
Iran	2	5
Iraq	11	9
Kuwait	4	3
Qatar	3	3
Saudi Arabia	9	8
Trucial Coast	1	1
Turkey	5	4
	37	35
Other Asia		
Australia	3	1
Burma	2	0
Indonesia	31	28
India	6	5
Pakistan	5	10
Japan	15	15
New Guinea	5	7
Philippines	1	1
Total	68	62
Grand total	620	590

French Savings

Iraq production gain cuts outlay of foreign currency

THE expanding production of Iraq resulting from completion of the new 30 and 32-in. line to the Mediterranean is allowing France to make further large reductions in its outlay of foreign currencies for crude oil.

France is Europe's second-largest refining country, ranking after the United Kingdom. The only important foreign production held by France is through Cie. Francaise des Petrole's 23.75 per cent interest in Iraq Petroleum Co., Ltd.

French oil officials in Paris estimate that next year, with the new pipe line in full operation, the country will be able to pay for about half its crude imports in francs, as against about 25 per cent formerly. Dollar purchases of crude oil will be cut to about 21 per cent of the total, while freight costs, considerably less due to the shorter haul from the Eastern Mediterranean, will be about 62 per cent in francs against 43 per cent formerly.

Total French refinery throughput in June was about 1,714,000 tons, or slightly above 400,000 bbl. daily. Last year, France imported 18,554,000 tons of crude oil, an average of about 370,000 bbl. daily, of which 49.3 per cent was paid for in sterling, 27.8 per cent in dollars, and 22.9 per cent in francs.

In 1951, crude supplies to France from the Middle East reached 16,592,000 tons, or 89.4 per cent of the total supply compared with 84.8 per cent in 1950. The increase from the Middle East in 1950 was balanced by a reduction of imports from South America which totaled 1,482,000 tons, or 8 per cent, against 13.7 per cent in 1950.

Scant Hope for Accord

Mossadegh quickly turns thumbs down on latest proposal for settling oil dispute; Parliament to consider reply

THE Iranian Parliament meets this week to act on the latest British-American offer to settle the oil-nationalization dispute, but there is scant hope it will be accepted.

The offer was made in a joint note to Iran over the signatures of President Truman and Prime Minister Churchill. It was the fourth major attempt to break the impasse and reflected the important international political and strategic questions in which the oil issue has become snarled.

Briefly, the new proposal from the two governments provides that the question of compensation would be placed in arbitration before the World Court and that the Iranian Government and Anglo-Iranian Oil Co., Ltd., would work out plans for resuming operations and export shipments.

As an inducement to Iran, the United States offered to give the Iranian Government an immediate $10,000,000, and Britain promised to ease restrictions on Iran's use of sterling and on exports to Iran.

Mossadegh obdurate . . . Iranian Prime Minister Mossadegh rejected the offer a few hours after it was delivered. He went on the radio to tell his people that the government could never agree to the message but that parliament would be called back from recess to consider an appropriate reply.

Meanwhile, W. Alton Jones, president of Cities Service Co., completed his tour of Abadan and the producing areas. He returned to Teheran. At Abadan, the oil executive was accompanied by five technical experts and the chairman of the Iranian Oil Sales Commission. Unofficial reports were that his party included Al Frame, Cities Service refining official and former assistant deputy administrator of the Petroleum Administration for Defense.

Exasperation . . . There were signs that the British and American governments were completely exasperated by Dr. Mossadegh's summary rejection of the new proposal. In some quarters, it was believed the Iranian prime minister might be doing a little oriental-style bargaining to make sure this was the West's final and best offer.

But even accepting this view, the outlook still is pessimistic considering the emotionalism and rabid nationalism which seems to prevent any realistic approach to the oil question in Iran. After Dr. Mossadegh's broadcast, the British Embassy in Teheran distributed 7,000 copies of the proposals to the Iranian public and press in an effort to show that the terms were fair.

The British-American proposals were in three parts which provided that:

. . . The question of compensation would be submitted to the International Court of Justice, "having regard to the legal position of the parties existing immediately prior to nationalization and to all claims and counterclaims of both parties."

This represented a major British concession in that it virtually recognized the nationalization carried out last year. However, the last clause stirred up a wave of opposition among members of Dr. Mossadegh's government. Iran has raised immense counterclaims against the oil company, contending among other things that the 1933 concession revision was invalid and hence the company owes duties on all equipment imported since that time. Iran wants these questions decided in Iranian courts—something Britain is almost certain never to agree to.

There is not much expectation that Anglo-Iranian will ever receive adequate compensation for its properties which are estimated to have a replacement value of more than a billion dollars. One observer remarked that the matter had boiled down to the fact that Dr. Mossadegh's government has taken the properties but was not willing to pay for them.

. . . "Suitable representatives shall be appointed to represent the Iranian Government and A.I.O.C. in negotiations for making arrangements for the flow of oil from Iran to world markets."

This provision apparently assumed that Anglo-Iranian would become the distributing agency for Iranian oil and would assist the national Iranian company in resuming operations. The British and American governments thus left the important questions of price and operations to future discussions. It was mainly on these points that the World Bank's efforts failed earlier this year.

As for this proposal, one of Dr. Mossadegh's right-hand men, K. Hassabi, asserted in Teheran that Iran would have no further dealings with Anglo-Iranian and would not consider giving it any part of the operation of the industry. Although Anglo-Iranian is the only international oil organization available to handle Iranian oil in any large volume, the Iranian government is pledged against allowing the company to make any profit on the country's nationalized production. On the other hand, Anglo-Iranian would require at least some shipping and marketing profit as in a normal commercial transaction. It is because of this that the question of the price at which Iran's oil would be exported becomes of crucial importance.

. . . When an agreement is reached on price and when physical conditions of loading permit, appropriate payments would be made to Iran for the oil already in storage at Abadan. This referred to the 10,000,000 to 12,000,000 bbl. of products piled up in the refinery tankage last year during the period when Anglo-Iranian was still operating the refinery but was prevented from making exports.

The object of this provision obviously was to give Iran money quickly to bolster the country's economy. The present Iranian deficit is running at about $14,000,000 a month, and payment for the storage products would tide the government over several months. The condition of these products after more than a year of storage is not known, and some oil men believe part of them would have to be rerun to be suitable for the market.

The $10,000,000 which the United States promised would be an outright gift to ease Iran's financial difficulties. The Teheran government is far behind in paying Army and government employes, but this has been a chronic condition in the country. Available information is that Anglo-Iranian's former employes are being paid by the government by withdrawals from its gold reserve. These employes are idle at Abadan and in the fields, except for maintenance work and the small level of operations being carried on to meet the needs for internal petroleum consumption in Iran.

Besides the $10,000,000 immediate United States grant and payment for the products at Abadan, the third part of the Truman-Churchill proposals also promised that Her Majesty's Government would relax exports and sterling restrictions placed in effect against Iran not long after the oil properties were taken over.

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Major concessions . . . The United States has long been exerting pressure on the British to make major concessions to the Iranian position in an effort to settle the oil problem and lessen the Communist threat in Iran. The joint approach symbolized in the Truman-Churchill note, the British recognition of nationalization, and the other terms were the result of several weeks of discussion between Washington and London.

There was no sign that the British were prepared to yield further to the Iranian claims. Officials in London were inclined to wait for the written Iranian reply to the Truman-Churchill note and give less weight to the statements made by Dr. Mossadegh in his radio broadcast. One view was that the Iranian prime minister took the message as a sign of weakness on the part of the United States and Britain and was seeking to push his advantage.

Several of the principal British newspapers recommended that their government stand fast on what was termed a "reasonable and conciliatory offer."

New 50-50 Pact

I.P.C. affiliate, shaikh of Qatar agree on terms

A 50 - 50 government - participation agreement has been reached by the shaikh of Qatar and Petroleum Development (Qatar), Ltd.

It is the fourth producing area in the Middle East to come under the 50-50 formula. Over the past 2 years, concession contracts have been revised along these lines in Saudi Arabia, Iraq, and Kuwait.

Petroleum Development (Qatar) is a part of the Iraq Petroleum Co., Ltd., organization. The announcement of the new agreement was made in London.

Qatar's original concession signed in 1935 provided for royalty of 3 rupees per ton, or about 8 cents a barrel based on present exchange rates. In May of last year, this was raised to 10 rupees per ton, or about 27 cents a barrel pending full modification of the concession.

Terms . . . Reports from London said the shaikh, Ali Bin Abdullah Bin Qasim Al Thani, will receive an income of from four million pounds to five million pounds under the new agreement on the basis of present production. This current output is about 64,000 bbl. daily, equivalent to an annual rate of slightly more than 3,000,000 tons. Production the first 7 months of this year in Qatar was 1,782,880 tons.

Using the upper limit of the estimate, five million pounds or $14,000,000, the royalty figures to a per barrel rate of around 60 cents, based on an annual output of 3,000,000 tons or 23,400,000 bbl.

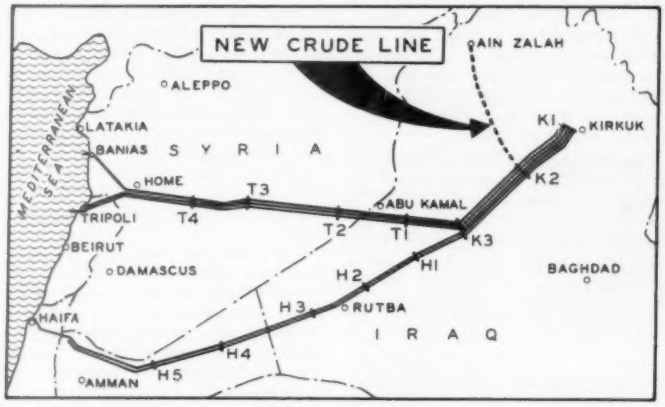
This figure approximates the per barrel government payment made by the operating companies in the larger Middle East countries.

Kuwait Output Sets Record

Crude-oil production in Kuwait rose to a new record high in June with an average of 810,200 bbl. daily.

The total was 3,412,514 long tons. The previous high in the shaikhdom was recorded last March, an average of 786,000 bbl. daily. June production was 763,000 bbl. daily.

The concession in Kuwait is owned by Anglo-Iranian Oil Co., Ltd., and Gulf Oil Corp. Burgan field, which had an important extension in the Magwa well last October, is regarded as the world's largest oil accumulation. In the last year its output has been a principal factor in replacing the crude lost in the Iranian nationalization.



I.P.C.'s Ain Zalah Crude Line Ready

IRAQ PETROLEUM CO., LTD., has completed construction of a 135-mile, 12-in. crude line to connect Ain Zalah field in northern Iraq with its main system to the eastern Mediterranean.

Plans call for beginning production at Ain Zalah at about 20,000 bbl. daily. This will be in the last quarter of this year—well in advance of the obligation in the old Mosul concession, which required the company to begin commercial production by March 1953.

Operations at Ain Zalah are conducted by Mosul Petroleum Co., Ltd., one of the I.P.C. associated companies. Ain Zalah was discovered in 1940 and has some 10 wells producing 33°-gravity crude. The field produces from a Cretaceous formation at 5,500 ft.

The new pipe line extends from the field to Station K-2 on the Tigris River. At K-2, the line joins I.P.C.'s main system, which at this point consists of two 12-in., two 16-in., and one 30-32-in. lines. The Ain Zalah crude will be shipped to the new I.P.C. terminal at Banias, Syria, for loading.

International Briefs

Despite some published reports to the contrary, Assam Oil Co., Ltd., failed to obtain production in its recently drilled Naga Hills wildcat in Upper Assam.

A study of the corrosive effects of oil and products on tankers has been launched by the Norwegian Research Institute for Ship Technology. The problem has become more acute with the increasing movement of Middle East crude, and corrosion of heating coils has resulted in frequent heavy bills for replacing equipment.

A French oil company has been organized to carry on exploratory work in Afghanistan. The company, Soc. des Forages en Afghanistan, was established by three existing French oil companies, Soc. Nationale des Petroles du Languedoc Mediterranean, Pechelbronn, and Soc. Forex.

Cycling Plant Opened

Activity picking up in Manantiales field; drilling rate to continue high, new refinery now under construction

A NEW 30,000,000-cu. ft. daily gasoline-cycling plant has been placed in operation in Manantiales field in southern Chile by Empresa Nacional del Petroleo, the Chilean Government oil company.

The plant, which was to be brought to full operation this month, includes a 3,300-hp. compressor plant and stabilization facilities for 6,000 bbl. of crude oil daily. There also is a topping unit with a capacity of 700 bbl. daily.

The eight fields on the southern tip of Chile, seven of which are located on Tierro del Fuego, and one, Delgada, on the mainland, now have a total of 55 wells, 13 of which are flowing producers and 42 are shut in. Current production approximates 2,500 bbl. daily, most of which is drawn from Sombrero and Victoria Sur.

Three rigs are now running in the area. Of these, two are on further development of Victoria Sur and other in Sombrero. Delgada, the one field discovered last year, has three shut-in producers completed at an average of 7,600 ft., approximately the same depth as those on Tierro del Fuego.

During the first half of 1952, ENAP completed three exploration wells, one gas and two dry, for a total footage of 24,288 ft. Twelve development wells were completed, eight oil, one gas, and three dry, for a total footage of more than 90,000 ft. During the last half of the year, the company expects to drill about 35,000 ft. on exploration and about 68,000 ft. on development work.

In the production area, ENAP expects to complete in October a 23-mile dry gas line from Manantiales to Victoria Sur and Sombrero. This 6⅝-in. returns gas from the new plant to the injection wells. There is also a wet gas line of the same diameter running from the two fields to the Manantiales plant. Crude lines in the area consist of the 42½-mile, 8⅝-in. line from Manantiales to the loading terminal at Clarencia and the 23-mile, 6⅝-in. delivering Victoria Sur and Sombrero crude to Manantiales.

Refinery started . . . ENAP's major project now getting under way is the construction of a 20,000-bbl. per stream day refinery to be located at Concon, on the northern outskirts of Valparaiso. Contract for design, engineering, purchasing, and supervision of construction by ENAP personnel, has been let to M. W. Kellogg Co.

Refinery facilities will include thermal cracking 6,200 bbl. per stream day, thermal reforming 3,970 bbl. per stream day, and visbreaking 4,960 bbl. per stream day. ENAP is now preparing the site for the start of construction. Completion is scheduled for 1954.

Several pipe lines are to be built in connection with the refinery project. For crude supply, a 12-mile, 8⅝-in. line will be laid from the port at Quintero near Valparaiso, to Concon, and an 8-mile line of the same diameter will move products from Concon to Salinas, the Valparaiso terminal of the distributing company.

In the planned category are three other lines, one an 11-mile, 8⅝-in. gas line to Valparaiso, and two 80-mile lines to Santiago—a 10¾-in. to move gas from the refinery, and a 6⅝-in. to deliver products.

The refinery will operate largely on imported crude oil pending further development of domestic production. At present, ENAP is selling most of the southern production to Uruguay. Products from the new ENAP refinery at Concon are to be marketed by the regular distribution companies in the country.

Pemex Contracts Held Legal

Mexico's attorney - general has held that the contracts signed by Pemex during the last few years with various foreign operators are completely legal.

His opinion was given on a question raised during the recent Mexican presidential campaign by Atalio Vasquez Pallares, an opposition member of Congress, who charged that Pemex violated the constitution and the 1938 expropriation law by making the agreements. Pemex then asked for the investigation by the attorney-general *(The Oil and Gas Journal, July 7, page 52).*

The attorney-general, Luis Canudas, said that the contracts endangered neither the spirit nor the letter of the Mexican oil - nationalization law. They are unquestionably legal, he said, especially so when their operation is carefully supervised to prevent misuse of the nation's oil production.

The contracts which were questioned were the percentage-of-production deals under which a foreign operator drills and recovers his costs plus a percentage of the oil if he is successful, receiving nothing if the well is nonproductive. Such contracts have been signed by Mexican American Independent Oil Co., E. W. Pauley, and the Sharples interests, among others.

Creole Changes Posting

Creole Petroleum Corp. has issued a new crude-oil price bulletin effective September 1 which makes several modifications in the first bulletin 6 weeks earlier *(The Oil and Gas Journal, August 4, page 60).*

The September 1 bulletin adds Mulata crude, 35/35.9° gravity, $2.63 a barrel, f.o.b. Puerto La Cruz. It drops the La Rosa crude listing included previously at $2.00 for 20/20.9° gravity at Amuay Bay or Las Piedras.

Tia Juana heavy crude is now listed at $1.89 for 19/19.9° gravity f.o.b. Amuay Bay. The earlier bulletin listed this crude at $1.65 for 16/16.9° gravity f.o.b. Amuay Bay or Las Piedras.

Pedernales crude is now listed at $1.27 for 20/20.9° gravity f.o.b. Capure (Pedernales). Previously this was shown at $1.40 for the same gravity, also f.o.b. Capure.

Peruvian Concessions Sought

Five Peruvian companies have requested a total of 25 exploration concessions under the recently enacted Peruvian petroleum law.

The government regulations administering the law gave Peruvian companies and individuals a preferential opportunity to file for acreage during the period August 11-September 9. Foreign companies may apply for concessions after September 9.

The 25 Peruvian applications were filed on the first day. They were: Augusto N. Wiese and Fernando Wiese, Peruvian businessmen, one application; Cia. Petrolera San Miguel, three applications; Cia. Peruana de Petroleo El Oriente, three requests; Cia. Peruana de Petroleo, 15 applications; and Cia. Nacional de Petroleo Peruana, three applications.

A number of foreign companies have indicated interest in taking acreage under the new law. These include Gulf, Standard of California, Socony-Vacuum, Conorado, and International Petroleum.

Board Chairman

George Hanks assumes new position with South Penn

GEORGE J. HANKS, the newly elected chairman of the board of South Penn Oil Co., is a foremost production authority who has been in the oil industry more than 4 decades.

Hanks' election followed his resignation as company president, a position he has held since August 1944. He also was named chief executive officer.

He joined Tide Water Pipe Co. in 1910 in the district office at Williamsport, Pa., his native city. Four years later he moved to Bradford, Pa., his headquarters until 1932. He also served as president of Bradford Transit Co., a position he still holds.

In 1924 he rose to the vice presidency of Tide Water Pipe Co., and became president in the early 1930's. Two years later he was transferred to New York where, in addition to his other duties, he was elected vice president and a director of Tide Water Associated Oil Co.

Hanks joined South. Penn in Pittsburgh as executive vice president in May 1944. He assumed the presidency upon the death of Noel Robinson. He returned to Bradford when South Penn moved its general offices there in 1946.

Leroy B. Fugitt has been appointed district geologist for Northern Natural Gas Co. at its new office in Amarillo, Tex. For several years he was district geologist in the Texas panhandle for Stanolind Oil & Gas Co. and recently has been stationed in Bismarck, N. D.

James W. Snider, geologist for Amerada Petroleum Corp. at Fort Morgan, Colo., has been transferred to Tulsa. He has been replaced by **Henry L. Hurley** at Fort Morgan.

Lloyd W. Whitney, engineer for Service Pipe Line Co. at Casper, Wyo., has been promoted to division engineer and assigned to the company's new operating section in North Dakota. At his new headquarters in Williston he will be in charge of the expanding gathering system in the Tioga area.

Robert L. Rose, formerly head of California drilling operations for Drilling & Exploration Co., Inc., has been elected vice president in charge of the contract drilling division at Los Angeles. **David M. Grubbs,** chief geologist the past 5 years, has been elected vice president in charge of the land and exploration division. **J. H. Lewis,** vice president, who has been in the company's foreign service the past 12 years, has been appointed head of the foreign division at Los Angeles. **A. E. Roberts,** supervising petroleum engineer, has been promoted to head of the producing division. **George I. McFerron,** formerly division geologist for Sohio Petroleum Co., at Houston, has joined the company as chief geologist.

Charles H. Glidden has been appointed a geologist for the Oklahoma division of Union Oil Co. of California at Tulsa. Before joining Union he was a geologist for Atlantic Refining Co. for 4 years at Shawnee, Okla. He received his degree from the University of Oklahoma.

N. H. Wheless, president of Wheless Drilling Co., Shreveport, has been appointed to the petroleum division of the southwest regional advisory committee of the National Association of Manufacturers.

John M. Allan, research chemist for Canadian Oil Companies, Ltd., since 1937, has been appointed chief chemist for the company's new Froomfield refinery. He previously was control chemist for Imperial Oil, Ltd.

N. W. Martison, Toronto, has been appointed division exploration manager in the new exploration and production office of Shell Oil Co. at Regina, Sask. **C. J. Bearden** has been named division geophysicist, and **G. A. A. Middleberg** has been named to handle production activities.

Glenn E. Nielson, Cody, Wyo., president of Husky Oil Co., and of Husky Oil & Refining, Ltd., in Canada, has been elected to the board of directors of Northern Natural Gas Co. He has served twice as president of the Rocky Mountain Oil and Gas Association.

Dr. Charles D. Russell has been named head of a department at the research laboratory of Carter Oil Co. at Tulsa to deal principally with development of new methods to improve oil recovery. Dr. Russell, who received his doctor's degree in 1941 from Duke University, has been engaged in production research since joining Carter in 1946.

Karl T. Feldman, chief engineer for Platte Pipe Line Co., has been transferred from Independence, Kans., to Kansas City.

Dr. R. L. Lupher, who joined Shell Oil Co. in 1945, has been appointed to the company's Pacific Coast area exploration staff in Los Angeles. For 14 years he was associate professor of geology at Washington State College, Pullman.

R. H. Simunick, engineering trainee for Atlantic Refining Co. at Magnolia, Ark., has been appointed a reservoir engineer at Dallas.

Harold C. Boone, formerly a junior corrosion engineer for Texas Pipe Line Co., at Tulsa, has been appointed senior engineer for Peoples Gas Light & Coke Co. at Chicago.

George Bertram, plant superintendent of the Sheridan gas district for Shell Oil Co., has been appointed manager of the Houston area gas department. He replaces **W. B. Golush,** who has joined the exploration and production department in New York. Other appointments in Shell's gas departments include: **J. A. Golasinski,** who succeeds Bertram; **R. W. Rabb,** superintendent at the Sheridan cycling plant; **W. J. Westhoff,** superintendent at the Provident City gas plant; and **C. E. Carlson,** superin-

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tendent of the new Gohlke gas-gathering system and compressor plant near Victoria, Tex.

John Merriam, president of Northern Natural Gas Co., has been elected to the board of directors of Calgary & Edmonton Corp., Ltd., of Winnipeg. Merriam will be the only United States citizen on the board.

E. J. Wacker, acting division superintendent at Houston for Magnolia Pipe Line Co.'s southern division, has been appointed assistant chief mechanical engineer at Dallas. **J. R. Wright,** district superintendent for the Houston and Beaumont districts, has been promoted to assistant superintendent of the southern division. **L. J. White,** assistant district superintendent of the Dallas district at Corsicana, Tex., has been named to succeed Wright. **M. R. Anderson,** chief engineer at the Hebert Station near Beaumont, Tex., has been appointed assistant superintendent of the Dallas district. Succeeding Anderson is **Wayne Harris,** assistant chief engineer at Corsicana.

N. E. Woolf, division machinist for Service Pipe Line Co., has been promoted to area master mechanic at Fort Worth. In his new position he will assist **F. M. Willenburg,** East Texas division manager, and his staff in installation and maintenance of pumping equipment.

James E. Lee, assistant operating foreman for Gulf Oil Corp. at Philadelphia, is on a year's assignment as chief of the products-supply branch of the refining division of the Petroleum Administration for Defense in Washington, D. C.

John S. Russell, assistant superintendent of the Falfurrias producing district of Magnolia Petroleum Co., has been transferred to the Chase, Kans., district. He will be located at Kimball, Neb. Other company changes include: **Henry L. Waszkowski, Jr.,** assistant superintendent in the Healdton, Okla., district, transferred to the Falfurrias producing district to succeed Russell; **John S. Goodrich,** assistant superintendent of the Pegasus producing district, transferred to the Healdton district as assistant superintendent; **Cletus H. Samples,** production foreman in the Pegasus district, promoted to assistant superintendent of the Pegasus district at Midland, and **John C. Fry,** driller in the Gulf Coast division, promoted to drilling-tools foreman.

Guests of the Houston Nomads

These four oil-industry men were guests at the August meeting of the Houston chapter of Nomads. Left to right are F. B. Adlaire, drilling superintendent of Caribbean Petroleum Co., Maracaibo, Venezuela; Kraus Earhart, The Texas Co., Houston; H. W. R. Wardlaw, special representative of Asiatic Petroleum Corp., Houston; and Arthur R. Phillips, drilling superintendent of Australasian Petroleum Co., Port Moresby, Papua.

James P. Thompson, assistant foreman of the North Plant at the Beaumont, Tex., refinery of Magnolia Petroleum Co., has been appointed assistant process superintendent in charge of oil movements. He has been replaced in the North Plant post by **Ralph Snover. John J. Etheredge** has assumed Snover's duties as catalytic cracking foreman. **Henry A. Landry,** unit operator, has been promoted to Etheredge's former position as shift foreman.

Herman George Gunter, formerly assistant manager for Carter Oil Co. at Billings, Mont., has been appointed assistant refining superintendent for Continental Oil Co. at Ponca City, Okla.

A. E. Woerheide, Jr., Wichita, has been appointed a petroleum engineer for Byrd Oil Corp., Dallas. For the past 12 years he has been exploitation engineer for Shell Oil Co. He has been in charge of all Shell's production-engineering activities in Kansas the last 3 years.

G. L. Reid has been appointed general manager in Trinidad of United British Oilfields of Trinidad, Ltd. He joined the Venezuelan general department of Royal Dutch-Shell at St. Helen's Court in England in 1922. In 1945 he became manager of the Latin American division of the Royal Dutch-Shell in London.

James B. Roche has resigned as an engineer in the Midland district office of the Texas Railroad Commission.

H. W. BROWN

H. W. Brown, assistant chief geophysicist for Carter Oil Co. since August, 1949, has been appointed chief geophysicist. He succeeds **R. W. Gemmer,** who has been named manager of the company's new northern exploration division. Brown joined Carter in 1935 as a seismograph party chief and served as district geophysical supervisor in Jackson, Miss., and division geophysical supervisor at Shreveport. He was transferred to Tulsa in 1945 as supervisor of foreign operations in the exploration department.

H. E. Freeman, superintendent for Sun Oil Co., has been transferred from Delhi to Mereaux, La.

A. W. Wood, division production superintendent for Lion Oil Co. at El Dorado, Ark., has been appointed regional production superintendent at Midland, Tex. Wood, who began his career in 1931 with Skelly Oil Co. at Seminole, Okla., worked for Phillips Petroleum Co. in Arkansas and Okla-

PERSONALS

Receive Exposition Invitations

Officials of Shell Caribbean Petroleum Co., Caracas, Venezuela, are shown as they received invitations to attend the International Petroleum Exposition in Tulsa next spring. Left to right are: T. Schoorel, acting head of the company exploration department; W. J. Baan, chief engineer; M. van der Plas, assistant manager of the legal department; Carlos Maal, head of local purchases; Dr. Jose Martorano, assistant manager; E. E. Branch, assistant manager in charge of public relations; Gov. Johnston Murray of Oklahoma; R. C. McCurdy, general manager; Oscar B. Irizarry, editor of Petroleo Interamericano, Latin American affiliate of The Oil and Gas Journal; and Dr. J. A. Giacopini, director of public relations. Governor Murray and Irizarry, who presented the invitation, were in Venezuela during a tour of Latin American countries to boost attendance at the exposition, to be held May 14-23.

homa before joining Lion. **Eugene L. Maxwell,** division exploitation geologist for Lion at Midland, has been named regional geologist there.

N. B. Larsh, who heads the Southern Production Co., Inc., office at Midland, Tex., has been named division exploration manager there. The Midland district office recently was designated a division office.

Robert L. Patton, instrument engineer for Gulf Refining Co., has been transferred from the refinery at Cincinnati to the refinery in Port Arthur, Tex.

A. C. McCall has resigned as head of the geological and land department of R. Olsen Oil Co. at Midland, Tex., to become an independent operator there.

To Direct Exploration Division

These men will direct exploration operations of Carter Oil Co. in the company's newly created northern division. Left to right, they are: L. L. Cline, division land man; R. W. Gemmer, exploration manager, and L. T. Hart, division geologist. The division will include Montana, North Dakota, South Dakota, northern Wyoming, Washington, Oregon, and northern Idaho. The divsion is expected to establish its headquarters before the first of the year.

Max E. Curry, production engineer for Skelly Oil Co. at Sweetwater, Tex., has been appointed district production engineer at Hobbs, N. M.

John H. Rebold, engineering trainee for Sohio Petroleum Co., has been transferred from Lafayette, La., to Pauls Valley, Okla.

DEATHS

G. Adrian Adams, 80, Ruston, La., pioneer resident who had extensive oil and gas holdings, died in a Thermopolis, Wyo., hospital September 1.

Lyle Dolan, 50, petroleum inspector for the U. S. Air Force, died August 26 in a Long Beach hospital.

Harry F. Mitchell, 67, Independence, Kans., treasurer of Union Gas System, Inc., died in a Kansas City hospital September 1. He had been an officer and director of Union for more than 30 years.

Robert J. Horn, 57, gas operating manager for Central Hudson Gas & Electric Corp., died August 30 in Poughkeepsie, N. Y.

John Cunningham Camp, 77, who had holdings in Reeves County, Texas, where the Tinstill oil pool was developed, died recently in a Pecos, Tex., hospital.

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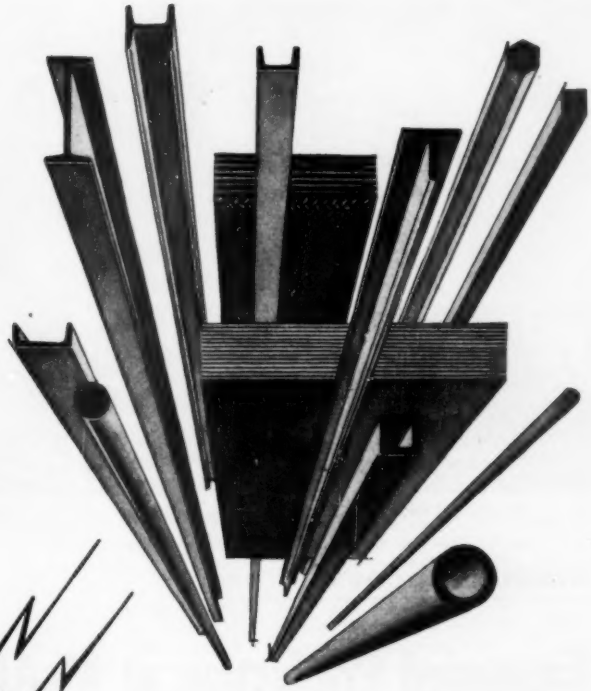

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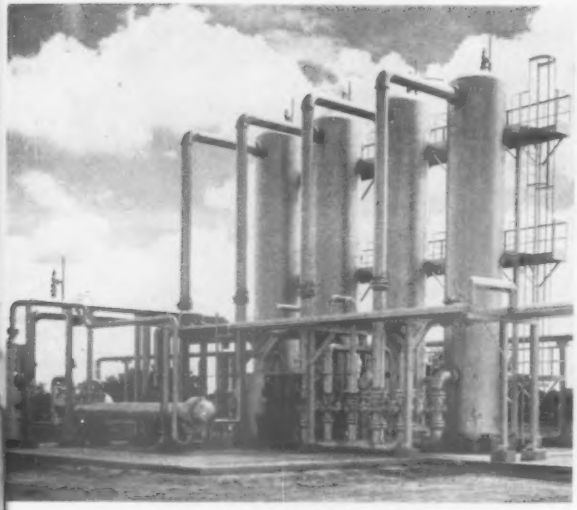


DEHYDRATORS at Taylor-Mayfair cycling plant.

PROCESSING UNITS at Taylor-Mayfair cycling plant.

REMODELING DOUBLES CAPACITY

Expanded Production at McAllen Will Feed Trunkline's Artery

To accommodate the increased capacity of the plant, many additional units plus auxiliary equipment had to be installed and tied in with the original system. A debutanizer and a propanizer were both added.

by
F. Lawrence Resen
Gulf Coast District Editor

AN extensive expansion program, more than doubling plant capacity, has been completed at Taylor Oil & Gas Co. and Mayfair Minerals, Inc., cycling plant at McAllen, Tex. The plant, originally rated for inlet gas capacity of about 75 million standard cubic feet per day and a liquid product output of 88,800 gal. per day, is now processing in excess of 140 million standard cubic feet and producing 152,800 gal. per day of liquid products.

A major portion of the plant's new capacity will go towards feeding Trunkline Gas Corp.'s new 1,775-mile transmission line, which has its southern terminus at McAllen and which travels northward to Tuscola, Ill. Of the 160 million cubic feet per day of residue gas, a maximum of 115 million will enter the Trunkline system. The 115 million cubic feet maximum output of pipe-line gas represents nearly half of the rated capacity of the 250-million-cubic-foot Trunkline system. Of the remainder, 25 million will be used for injection purposes and 20 million will be used in Rio Grande Valley Gas Co.'s pipe-line system and other local outlets.

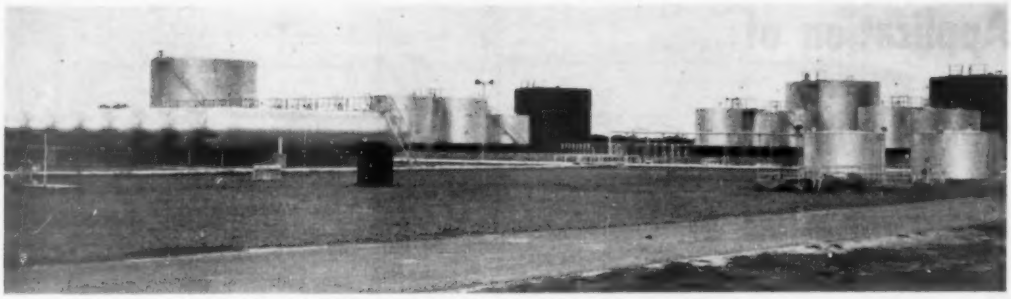
Gas for the plant is obtained from McAllen and Pharr fields, Hidalgo County, South Texas, where 25 producing wells have been completed, 2 are in the process of being drilled, and several additional wells are contemplated. The wells are producing from 10 horizons with the reservoir bottomhole pressures ranging from 3,000 to 9,200 psi. Three wells are used for injection in cycling operations.

Additional equipment . . . To accommodate the increased capacity of the

DESIGN CAPACITIES

	Million standard cubic feet	
	Old capacity	New capacity
Inlet gas:		
(a) Cycle system	56.50	27.57
(b) Pipe-line sales		139.52
(c) R.G.V. sales	18.75	
Total	75.25	167.09
Residue gas:		
(a) Cycle system	50.00	25.00
(b) Pipe-line sales		*115.00
(c) R.G.V. sales	20.00	20.00
Total	70.00	160.00
	Gallons per day	
Liquid products:		
(a) Propane	11,000	16,000
(b) Butane	11,000	25,000
(c) Gasoline	40,000	40,000
(d) Kerosine	19,500	19,500
(e) Absorption oil	5,000	5,000
(f) Residue	2,300	2,300
(g) Stab. dist.		127,000
Total	88,800	234,800

*Maximum.



STORAGE TANKS at Taylor-Mayfair cycling plant.

plant, many additional units plus auxiliary equipment had to be installed and tied in with the original system. A second debutanizer and depropanizer were added to the plant, both towers being 5 ft. o.d. by 34-tray units, and which operate parallel to the original units. A 42-in. o.d. by 8-tray distillate stripper was included to complement the operation of the high-pressure still with its original stripper.

The enormous increase in sales of residue gas being made required the addition of two 6 ft. i.d. by 20-tray pipe-line sales-gas absorbers, bringing to four the number of absorbers at the plant, the others being the original sales-gas absorber and cycle-gas absorbers. In keeping with the emphasis on sales gas was the installation of four 5 ft. i.d. by 28-ft. S.S. dehydration contactors through which the residue gas passes on its way to the metering station within the plant environs. Extra pumping capacity for the lean-oil service was supplied with a new 485-g.p.m. pump, and the additional electrical load required the installation of a 237-kw. generator.

Compressor capacity on hand was sufficient to handle the increased load as well as provide 400 of the 1,600 hp. total for refrigeration service. A 2,000-g.p.m. induced-draft addition was made to the existing cooling tower as well as changing over the two stills reflux condensers to air cooling.

Process Flow

The plant process system consists essentially of five units: gas inlet section; absorber section, including demethanizer reabsorber; still section, with evaporator dephlegmator; the fractionating section; and the dehydration section.

Individual gathering lines from the wells enter the plant and flow is combined in a manifold-header arrangement which provides for the test separation of the wells. Gas flowing into the plant enters at three pressures, 550, 1,200, and 2,000 psi. The three streams are scrubbed separately and fed to the various gas absorbers.

Part of the gas from the high-pressure scrubber is diverted to the cycle-gas absorber where it comes in contact with lean oil. The cycle gas from this absorber is scrubbed before being compressed to the injection pressure. Rich oil from the cycle-gas absorber is passed into the sales-gas absorbers and the rich oil from all three of the sales-gas absorbers is collected in the rich-oil flash tank. Sales gas passes through scrubbers before going on into the de-

ters the metering station for entrance hydration contactors from where it en-

into pipe lines.

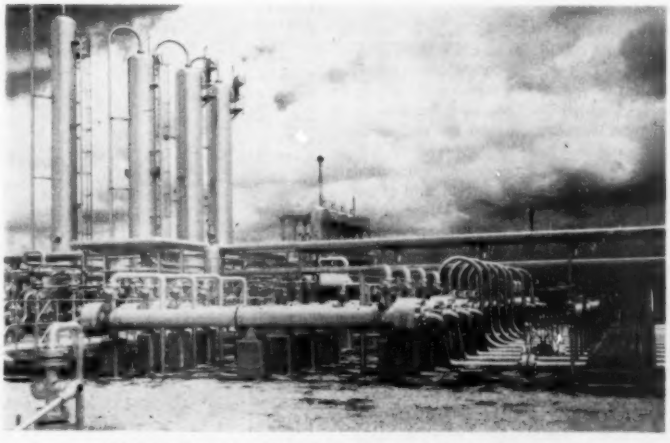
Methane and ethane are stripped from the rich oil in the demethanizer reabsorber, consisting of absorption and stripping sections, oil intercoolers, and a rich-oil drawoff tray in the bottom of the absorber section. The light-gas overhead is scrubbed and placed in fuel-gas service while the demethanized rich oil is charged to high-pressure still.

The rich oil is partially stripped in the still and is then charged to the evaporator - dephlegmator, overhead is shunted to the fractionating section. The overhead of the evaporator-dephlegmator, which is gasoline, also goes to the fractionating section.

Stripped distillate plus a slip stream of lean oil are fed to a distillate fractionator and separated into various products. Lean oil from the tower is returned to the system.

Three towers, a depropanizer, a debutanizer, and a deethanizer are used for final recovery of products. In a deviation from conventional operation, the depropanizer is used for initial separation to avoid high reboiler temperatures necessary when considerable percentages of heavy components are included in the deethanizer bottoms.

Contractor . . . The original plant plus the new additions were designed and constructed by Gasoline Plant Construction Co., Houston and Corpus Christi.



ABSORBERS at left and inlet gas lines at Taylor-Mayfair plant.

Application of MicroLogging to Determination of Porosity

Part 2 of Two Parts

by H. G. Doll,* R. Sauvage,† and M. Martin†

This new electric log may be used to determine the resistivities of porous formations close to the wall of a well. Interpretation charts are then used to evaluate porosities of the formations from these resistivities. The MicroLog may also be used in quantitative determination of fluid saturations. Examples of these uses of MicroLog data are given in this concluding portion of the article.

THE following examples are relative to formations which may be considered as containing negligible amounts of conductive solids. Besides, in these examples porosity values were computed without taking the possible presence of residual oil into account.

Fig. 3 shows the conventional curve and the MicroLog recorded through the Yegua formations in a Gulf Coast well (Well No. 1).

The data for this well are the following:

Bit size: 9⅞ in.

R_m = 1.2 ohm-m. at BHT (150° F.).

Table 1 gives the corresponding values for R_{mc} and R_{mf} equal respectively to 1.14 and 0.99. The chart for R_{mc} = 1.2 was therefore chosen for the interpretation.

The values of porosity computed from the logs for the three sand intervals, I, II, III, shown on the figure, are tabulated hereafter. The average values for each of the above sections are matched with the average values derived from core analysis, which are given in the right-hand column.

In this analysis the intervals, a, b, c, d, have been excluded since they contain a substantial amount of shale according to the MicroLog, the SP curve

*Director of research, and †interpretation department, Schlumberger Well Surveying Corp., Ridgefield, Conn.

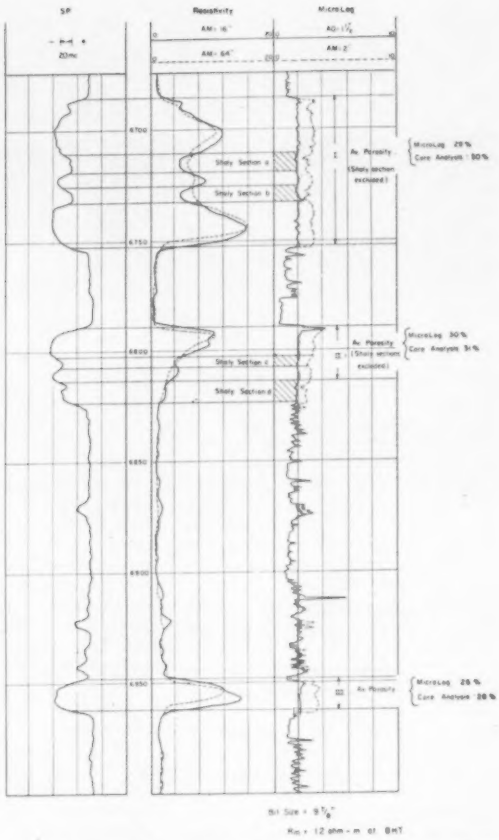


Fig. 3—Conventional curve and MicroLog record through the Yegua formations in a Gulf Coast well (Well No. 1).

WELL NO. 1—GULF COAST—YEGUA

Depths, ft.—	$R_{1\frac{1}{2}\text{ in.}}$	$R_{2\text{ in.}}$	h, in.	R_{xo}/R_{mf}	—Porosity in per cent— MicroLog	Core analysis
Interval I:						
6,685-88	2.1	3.2	⅝	8	30	
6,692-98	1.95	3	¾	7.5	31	
6,699-6,704	1.95	3.15	¾	10.5	26.5	
6,706-08	2	3.2	¾	10	27	
6,709-11	2	3.15	¾	9	28.5	
6,722-26	2	3	¾	7	32	
6,734-37	2	3.05	¾	7.5	31	
6,737-40	2	3.15	¾	9	28.5	
6,748-52	2	3.2	¾	10	27	
Average					29	30.3
Interval II:						
6,772	2.3	3.7	⅝	15	23	
6,796	2.1	3.1	⅝	6.7	33	
6,798	2.1	3.3	⅝	8	30	
6,800-04	2	3	¾	7	32	
6,808-12	2	3	¾	7	32	
Average					30	31
Interval III:						
6,952-54	2.1	3.5	¾	13	25	
6,956	2	3.15	¾	9	28.5	
6,958-60	2.2	3.5	⅝	10.5	26.5	
6,960-64	2.1	3.4	¾	11	26	
Average					26.5	28

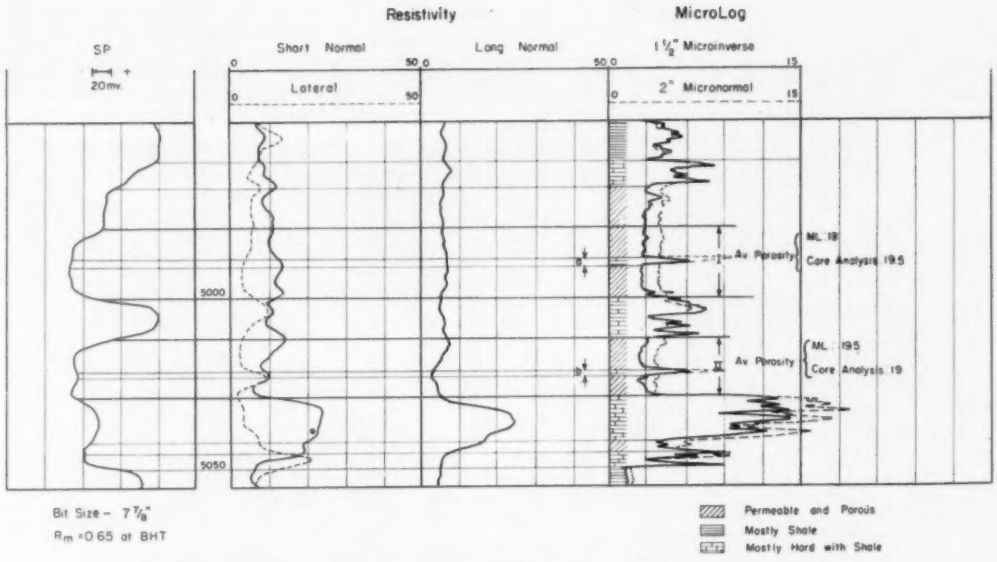


Fig. 4—Example of quantitative interpretation of MicroLog (clean formations of medium porosity).

and the conventional resistivity curves.

The table hereafter gives further examples of comparative average porosity values determined from the MicroLog and from core analysis in various wells and for various formations of the Gulf Coast:

OTHER EXAMPLES — MICROLOG VS. CORE POROSITY

Example and formation—	Thickness studied (ft.)	Average porosity in per cent: Micro-Log	Core analysis
Well 2, Yegua Cockfield	36	28.6	29.6
Well 3, Wilcox	18	23	24
Well 4, Wilcox	21	25	21
Well 5, Frio	10	31	34
Well 6, Yegua	53	29	28
	25	34	32
Well 7, Yegua	10	34	35

Fig. 4 shows a section of a well drilled through the shales and consolidated sands in North Texas. The data for the well are the following:

Bit size: 7⅞ in.

R_m = 0.6 ohm-m. at 123° F.

Table 1 gives R_{mc} = 1.09 and R_{mf} = 0.69. The chart for R_{mc} = 1 is chosen. The porosity values derived from the MicroLog in intervals I and II, where core analyses are available, are tabulated hereafter:

In the averages of well No. 8 the values found in sections a (4,991 ft.) and b (5,023 ft.), which correspond to comparatively tight beds, have been discarded.

In addition to this, the following examples from Mid-Continent are given hereafter:

WELL NO. 8—NORTH TEXAS

Depths, ft.—	$R_{1\ 1/2\ in.}$	$R_{2\ in.}$	h, in.	R_{in}/R_{mf}	Porosity in per cent: Micro-Log	Core analysis
Interval I:						
4,980	2.85	3.9	3/8	20	20	
4,982	3	4.2	3/8	23	18.5	
4,984	3	4.35	3/8	27	17.5	
4,986	2.7	4.05	3/8	27	17.5	
4,988	2.85	4.12	3/8	24.5	18	
4,990	2.7	4	3/8	25.5	18	
4,991	6.5	9.7	1/8	160	8	Not included in the average
4,992	2.7	4.05	3/8	27	17.5	
4,994	2.7	4	3/8	25.5	18	
4,996	2.7	4	3/8	25.5	18	
4,998	2.7	4.05	3/8	28	17	
5,000	3.9	5.4	1/4	36	15	
5,001	3.15	4.2	1/4	20.5	19.5	
Average					18	19.5
Interval II:						
5,014	3	4.35	3/8	28	17	
5,016	2.63	3.9	3/8	24.5	18	
5,018	2.4	3.75	1/8	31	16.5	
5,020	2.4	3.6	1/8	23	18.5	
5,022	2.7	3.9	3/8	23	18.5	
5,023	6.45	9.3	1/8	150	8	Not included in the average
5,024	3	3.9	1/4	18	21	
5,026	2.25	3.3	1/2	15.5	22.5	
5,028	2.92	3.75	1/4	18	21	
5,030	3	3.6	1/4	14	23	
Average					19.5	19

MID-CONTINENT WELLS — MICROLOG VS. CORE POROSITY

Examples—	Thickness studied (ft.)	Porosity in per cent: Micro-Log	Core analysis
Well 9	15	14	15
Well 10	12	19	15.5
Well 11	11	20	18
Well 12	10	13	14.5
Well 13	17	15	12.5

Case of Very Shallow Invasion

In formations with high porosity and permeability the invasion often happens to be so shallow that the MicroLog readings can be somewhat affected by the uncontaminated formations beyond the invaded zone.

Two cases should be considered:

(a) **Water-bearing formations** . . . In most cases the connate water has a re-

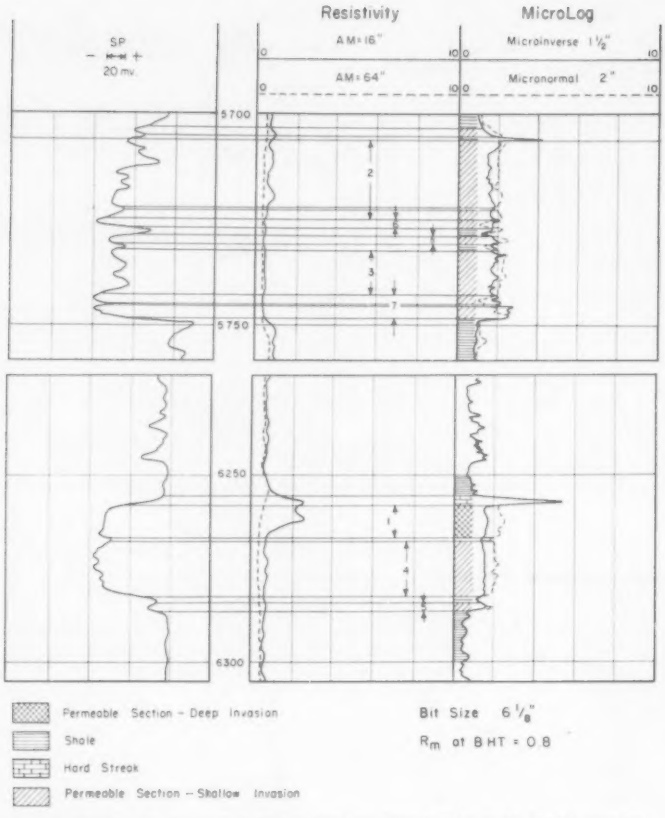


Fig. 5—MicroLog in the case of shallow invasion; water-bearing sands of high porosity.

sistivity less than the resistivity of mud filtrate, so that the resistivity R_t of the uncontaminated formation is less than R_{xo}. If the invasion is so shallow that the measurements made with the MicroLog involve a part of the noninvaded zone, the recorded values are reduced with respect to the values which would be obtained in the case of a deep invasion, all other factors remaining the same. Furthermore, the decrease is more important with the Micronormal than with the Microinverse. The measurements therefore, when plotted on the charts, lead to an apparent value for R_{xo} which is lower than the true value, and the porosity determined from the MicroLog is greater than the true porosity.

The presence of a shallow invasion very often can be ascertained from the characteristics of the logs: the readings with the conventional devices are all very low, and the separation between the short normal and the long normal curve is much reduced, and is even nil. Accordingly, when such features are observed on the conventional logs, the interpretation of the MicroLog should be made with great caution, especially from the quantitative standpoint.

It should be furthermore said that, in many cases, the separation between the two MicroLog curves is reduced to nil, and even is negative. This of course is very clear indication, and the corresponding formations are easily eliminated from the quantitative analysis.

It may be recalled also that in high permeability sands there is an appreciable part of the mud cake which builds up inside the pore space of the formations. This part of the mud cake has a resistivity higher than that of the mud cake formed outside, to a ratio which is equal to the formation factor of the formation, i.e., at least 5. As a result, the values measured with the Microinverse are increased more than those measured with the Micronormal. This effect therefore contributes to create a negative separation on the MicroLog.

Fig. 5 shows, as an example, two portions of the logs recorded through water-bearing formations of high porosity in the Gulf Coast. Section 1 shows a large separation between the readings of the short and the long normal, which corresponds to a rather deep invasion; the porosity derived from the MicroLog is equal to 30 per cent, against 32 per cent given by core analysis. Opposite Sections 2, 3, 4, and 5 the two normal curves are very low and close to each other, which indicates a shallow invasion.

The separation between the two MicroLog curves accordingly is smaller than on Section 1, and the porosity derived from the MicroLog would be much higher than the true porosity. Opposite Sections 6 and 7 the two normal curves practically coincide, and the separation on the MicroLog curves is negative. Bed 8 gives a positive separation on the MicroLog, whereas the two normal curves coincide. It is likely that some invasion took place in this case, but the bed is so thin that the presence of this invasion cannot be reflected on the short normal curve.

(b) **Oil-bearing formations . . .** The true resistivity R_t of an oil-bearing formation may be greater or smaller than R_{xo}, depending on the ratio R_w to R_{mf}, on the water saturation . . . etc. . . . For low water saturation, however, and when the mud is not abnormally fresh, R_t is usually higher than R_{xo}, which

The Authors Say . . .

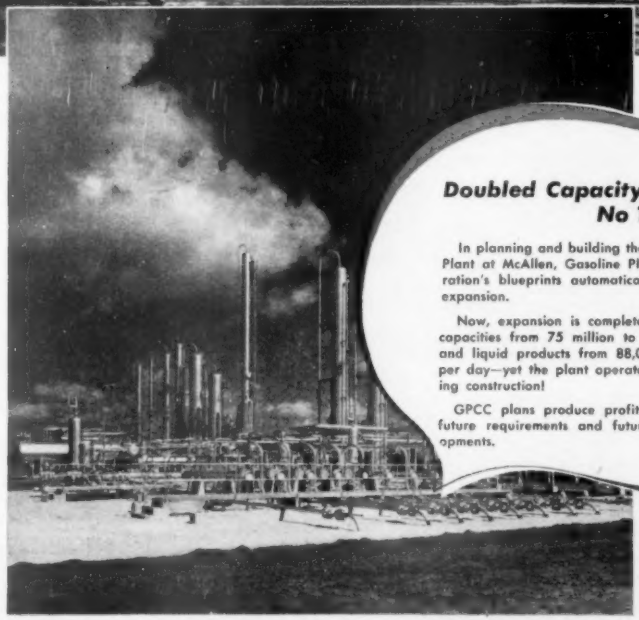
The MicroLog is an instrument for the accurate determination of the boundaries of permeable beds, and it also makes possible the evaluation of porosity in many instances. The MicroLog is furthermore a help in the determination of fluid saturation.

To this effect, appropriate interpretation charts are used, wherein the values recorded on the MicroLog opposite a porous bed are entered on one side, and the corresponding values of the porosity and of the formation factor are read on the other side.

This method has proved accurate in the case of unconsolidated formations of high porosity and with a small content of conductive solids. Reasonable results are also obtained in consolidated formations of medium porosity. Although good results are sometimes given by the MicroLog in hard formations, a better accuracy should be expected in this case from the application of a different method, the MicroLaterolog, which is just being now introduced in the field.

The correction for the presence of conductive solids on the porosity determinations are now being studied, and only approximate and provisory data are available at the present time.

TODAY IS THE FUTURE WE PLANNED FOR



Doubled Capacity With No Time Lost

In planning and building the Taylor-Mayfair Cycling Plant at McAllen, Gasoline Plant Construction Corporation's blueprints automatically provided for future expansion.

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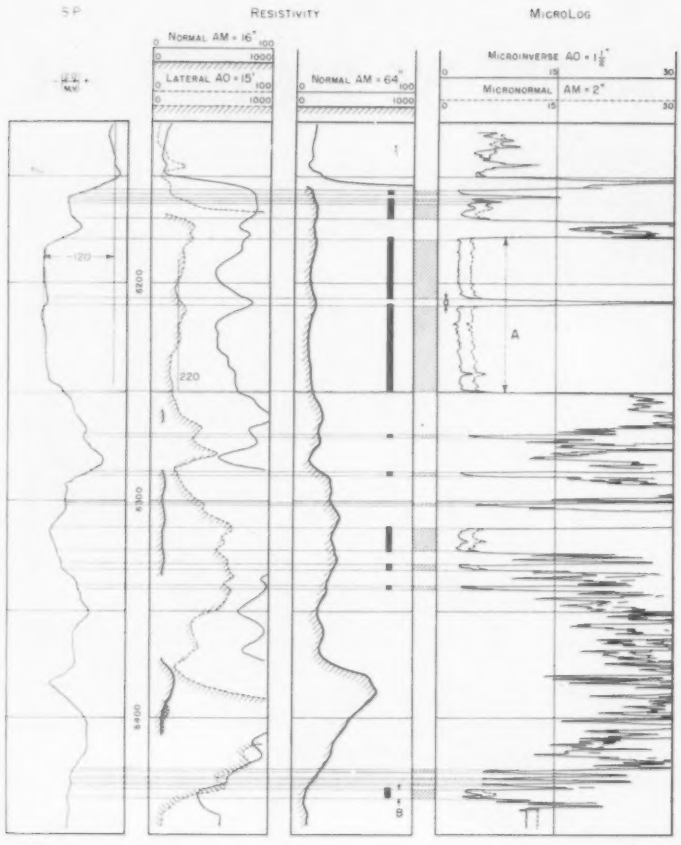

EXAMPLE OF THE USE OF MICROLOG IN THE DETERMINATION OF FLUID SATURATION

Fig. 6—Data for well No. 15, North Texas area; bit size = 7⅞ in.; R_m (at BHT) = 0.7 ohm/m.

Interpretation for Section A is: Average values of F from MicroLog = 40. Average porosity = 15 per cent. R_w from SP curve = 0.035 ohm-m (BHT). R_t from lateral curve = 150.

$$\text{Water saturation} = \sqrt{\frac{40 \times 0.035}{150}} = 10 \text{ per cent.}$$

amounts to an increase of the values recorded with the MicroLog and of the separation between the curves. The values of porosity derived from the MicroLog are therefore too low.

It is again possible in some cases to ascertain, from the comparisons of the MicroLog and other curves, whether the invasion is shallow enough for the MicroLog readings to be affected by R_t. The comparison, however, is not so easy and accurate as in the case of water-bearing formations.

MicroLogging a Help in Saturation Determination

It is known that the evaluation of the fluid saturation in a porous bed from the electrical curves can be made by means of Archie's formula:[2]

$$S = \left(\frac{F \times R_w}{R_t} \right)^{1/n}$$

where:

S = water saturation in per cent of pore space
F = formation resistivity factor
R_w = resistivity of connate water
R_t = true resistivity of formation

For the application of the formula, the value of the formation factor, which was formerly determined on cores in the laboratory, **can now be obtained by means of the MicroLog.** As seen in this article, the interpretation charts contain a scale which gives the values of the formation factor (opposite the values of porosities) as derived from the values read on the MicroLog.

A complete discussion about the determination of the two other factors, R_w and R_t, would be beyond the scope of the present article. The following brief indications regarding them will be recalled:

The resistivity R_w of the connate water is connected with the amplitude of the deflection of the SP curve observed opposite the bed. When the bed is thick enough the amplitude of the deflection is equal to the "Static SP," i.e., to the total e.m.f. which generates the spontaneous current[6]—which in turn can be approximately taken as being equal to $-K \log R_m/R_w$ (R_m, mud resistivity). In this expression, K is a coefficient which has been found empirically equal to about 90 in many cases, but which may vary between about 50 and 120, depending on the conditions found in the regions under survey.

It should be recalled that the expression of the Static SP is actually more complex,[7,8] and that, accordingly, the expression $-K \log R_m/R_w$ should be considered as giving only a convenient way to a fast estimation of the order of magnitude of R_w. Needless to say that the value of R_w should be preferably measured on samples of connate water, whenever such samples are available.

The value of the true resistivity of the bed is obtained, in most cases, from the conventional resistivity curves, provided the thickness of the bed is great enough, or from such new devices as the Laterolog and/or the induction log—with the help of appropriate departure curves, if necessary.

This procedure will be illustrated with the following example: Fig. 6 shows the MicroLog and the conventional curves recorded in a North Texas well. Several porous and permeable sections are indicated by the MicroLog (crosshatched areas on the figure). Among them Section A will be considered in detail.

If the thin tight streak denoted as "a" is discarded, the quantitative analysis of the MicroLog in Section A shows that the formation factor and the porosity vary within comparatively narrow limits throughout the section. In other words, the whole section can be taken as being one single fairly homogeneous bed. The total thickness of this bed is about 70 ft., so that the effect of the adjacent formations on the values recorded on the conventional curves, even on the long lateral curve, can be neglected.

(a) The average value of R_{xo}/R_{mf} throughout the section, as derived from the MicroLog charts, is equal to 40, and the average formation factor, supposing 15 per cent residual oil in the flushed zone, is about equal to 30. (The corresponding value of the average porosity would be about 17 per cent.)

(b) The amplitude of the deflection of the SP curve is equal to —120 mv. According to the experience gathered in the region where the well is located, the value of the K coefficient would be around 90; the corresponding value of R_m/R_w is, therefore, about 20. Since R_m is equal to .7 at BHT, R_w can be taken equal to 0.035, as a first approximation.

(c) Value of R_t—The average apparent resistivity read on the long lateral throughout the section is equal to 220 ohms/m which, after correction with the departure curves for beds of infinite thickness, gives an average value of 150 ohms/m for R_t.

Taking the exponent of Archie's formula

(Continued on page 94)

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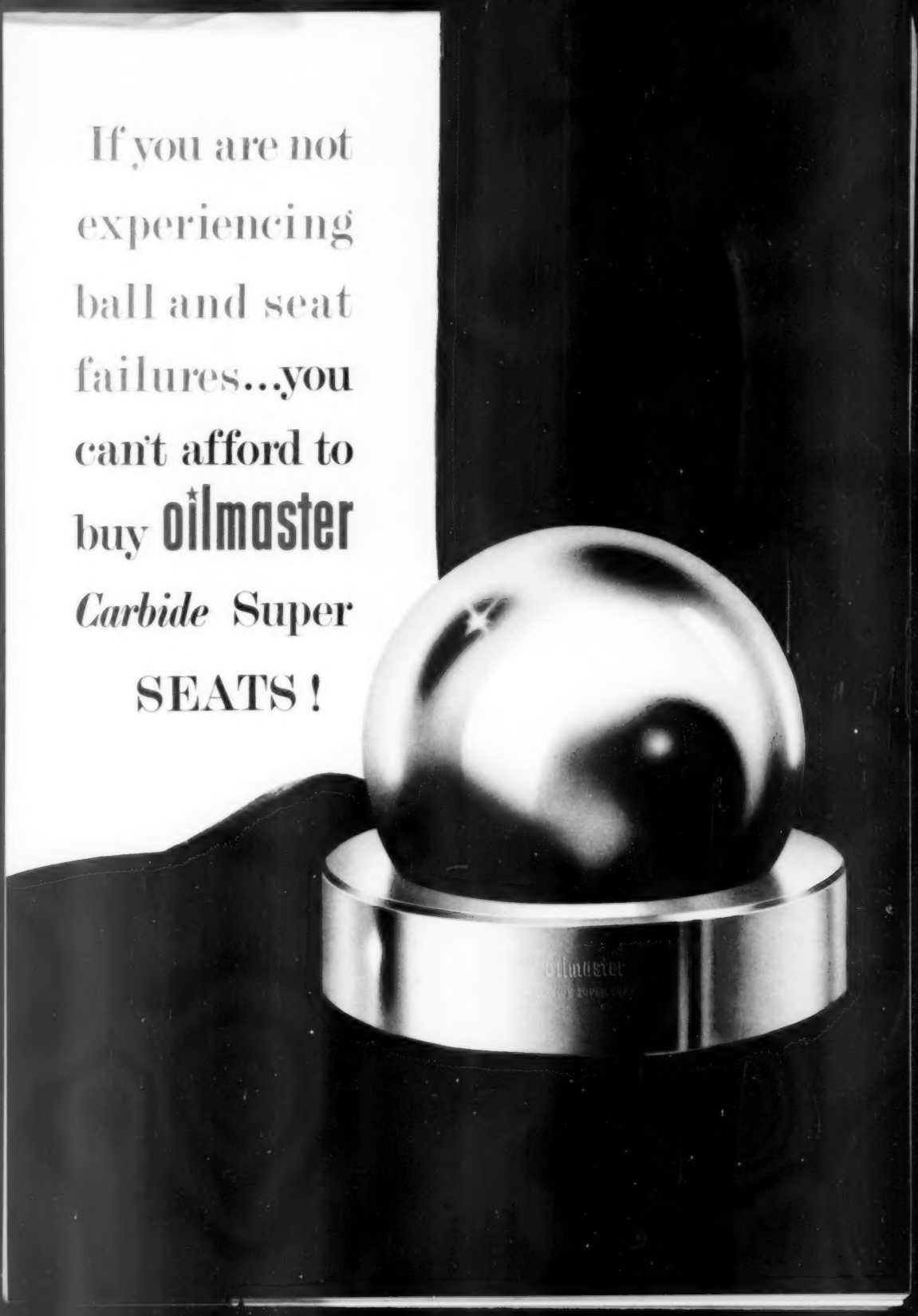

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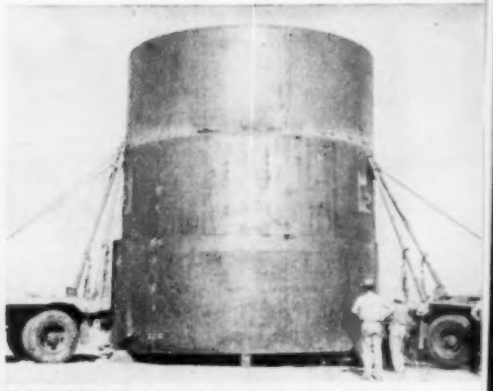
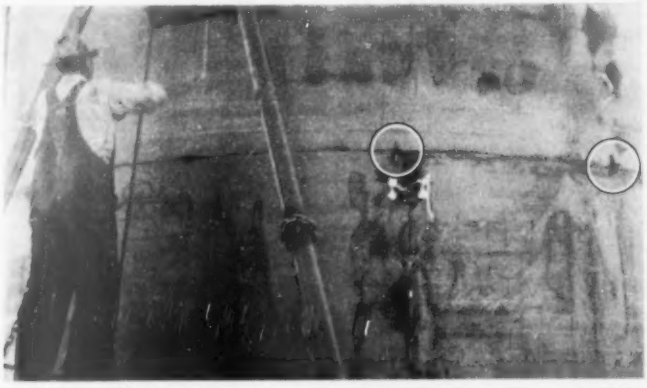
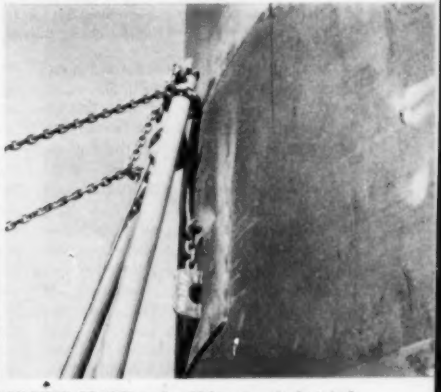
1 DIMENSIONS OF BOTTOM SECTION of this large tank are the same as those of a standard 1,000-bbl. tank. Nested upper section is of lesser diameter, but of little larger over-all height.



2 EYES ARE WELDED to the side of the tank to furnish a connection for hooks from the winch trucks which lift the tank section. Wall of the tank is reinforced by a plate.



3 OPPOSITE SIDES of the circumferential seam are lined up by pins on either side of the wall being driven through closely spaced holes in a thin steel plate. Two such clamps are shown circled here.



4 REINFORCING PLATE under lifting eyes is just tack-welded onto side of tank so that it can be removed after erection of tank is completed.

Shop-Field Erection of 1,500-Bbl. Storage Tank

Saving of 100 man-hours effected by unusual method of fabrication, with additional advantage of superior welding due to shop control and testing

by Roy F. Carlson
West Texas District Editor

SHOP fabrication of lease oil-storage tanks has developed into a fine art in yards of West Texas manufacturers. Vessels of up to 1,000-bbl. capacity are completely fabricated and hauled to the field ready for final connections to be installed. But tanks much larger than this become unwieldy and some different technique must be applied—the one to be described here being a combination of field and shop welding.

This 1,550-bbl. wash and settling tank is on the Texas University "M" lease of Phillips Petroleum Co. in Fullerton field, West Texas, and serves as a power oil supply for a bottom-hole hydraulic pump. The tank was fabricated and erected by Sivalls Tank Co. of Odessa, Tex.

When erection was completed the tank was formed of three rings of ¼-in. plate, each 8 ft. high, giving the tank an over-all height of 24 ft. from the bottom of the lowest ring to the edge of the tank deck. The finished tank has a diameter of 21 ft. 7 in., making a very bulky package to handle fully assembled, weighing about 30,000 lb.

To keep the tank package to a size that would handle easily the vessel was only partially assembled in the shop with about 60 per cent of the welding done there. As shown in Fig. 1, the

5 NUMEROUS CONNECTIONS mark the finished tank since it serves both as a wash tank and as a supply for a bottom-hole hydraulic pumping system. As such, it requires a siphon for oil-water level control and outlets for the power oil supply.

bottom ring and the bottom were completely shop assembled with all welds completed on both sides of the joints on the bottom. This method of fabrication permitted double welding of the bottom seams in the shop, a practice that is virtually impossible to use in the field because of inability to turn tank bottom over to weld seams on both sides.

At the same time, in the shop, the two rings were welded together circumferentially, but a vertical seam was left open across both rings. The deck also was added in the shop and the joint connecting it to the wall of the tank was welded about halfway around the tank. All joints in the deck were completed except for one radial seam from the center to one side. This open seam joined the vertical open seam in the two circumferentially joined rings.

The diameter of this top portion of the tank was then reduced by pulling opposite sides of the open seam together with a clamp so that the edges overlapped. It was pulled together far enough so that eyes welded near the lower edge of the middle ring—the bottom of this two-ring upper section—would fit inside the finished bottom portion of the tank. Once the top portion of the tank was pulled together far enough and held in that position, it was slipped into the finished bottom section and was ready for moving to the field. This package had essentially the same dimensions and was moved in much the same manner as a completed 1,000-bbl. tank, using a special low trailer.

Once in the field, the trailer was set down near the location, leveled and shored up by timbers, and the nested parts of the tank were denested using three winch trucks, two of which are shown in Fig. 1. These trucks hooked on to the eyes welded to the side of the upper part of the tank to lift that part out of the bottom portion, as shown in Fig. 2.

As soon as the upper part of the tank was lifted clear of the bottom portion, the clamp holding the sides of the open seam of the upper tank section was loosened and that part of the tank was permitted to expand to its normal diameter. The edges of the open seams were then matched and held in place by small clamps consisting of light-gage metal with two holes punched close together. This thin strip of metal was slipped between opposite sides of the joint and pins were driven through the holes in the strip. The pins on the inside of the tank were tapered, those on the outside were straight. Driving of the inside pin into the hole in the strip caused the walls of the tank to bear against the outside pin and align themselves for welding. These line-up devices are shown in Fig. 3. After tack welding the circumferential, vertical, and top seams, the line-up clamps were removed and the welding of all seams was completed.

Tank fittings were then installed and the tank was hauled into place in the battery, unloaded from the low trailer, adjusted into final position and connected up to intake and discharge lines. The completed tank is shown in Fig. 5.

This tank is probably the first of its kind in existence erected in this manner. Fabrication in this manner consumed about 200 man-hours of time, including shop and field welding. A similar tank completely erected in the field would probably consume nearer 300 man-hours of time. In addition, field welds would possibly be poorer because of lack of shop control and testing practices, and some of the bottom seams would be welded on one side only, as mentioned.

Field welding of the tank required three men for 3 days, one of the men being a helper. Over-all, after preparation of the tank for shipment from the plant, 1½ days were consumed in hauling and tack-welding the tank before finish welding began. The tank location is about 50 miles from the plant site.

MicroLogging

(Continued from page 90)

equal to 2, the water saturation in the uncontaminated zone, therefore, is equal to

$$\sqrt{\frac{40 \times 0.035}{150}}$$

or around 10 per cent.

The computation of water saturation in the other permeable and porous sections is not so easy, because these sections are comparatively thin, and their true resistivities cannot be determined accurately from the conventional logs. Considering, for example, Section B, whose thickness is about 4 ft. according to the MicroLog, it appears that the long lateral curve is very much distorted and cannot be relied upon; the long normal curve, nevertheless, is easily readable. Because of the presence of the tight formations above and below the bed, it is likely that the value read on the long normal, namely 100 ohms, is an upper limit for R_t. A reasonable lower limit can be taken equal to 50 ohms. Furthermore, the SP curve is not entirely developed, but it can be assumed that the value of R_w is the same as in Section A, i.e., 0.035 ohm/m. The MicroLog gives, for the formation factor, a value about equal to 35—hence the water saturation would be comprised between $\sqrt{35 \times 0.035/100}$, or 11 per cent, and $\sqrt{35 \times 0.035/50}$, or 15 per cent. Values of saturations of the same order would be found for the other thin sections.

Almost all the permeable sections were gun perforated: the well produced 214 bbl. of oil per day through a 16/64-in. choke.

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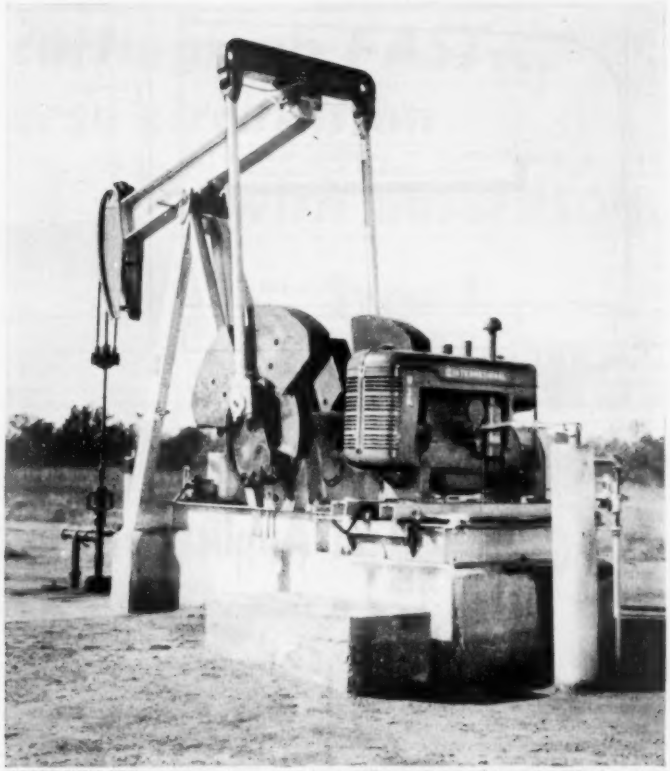
Pumps Fine for PINE



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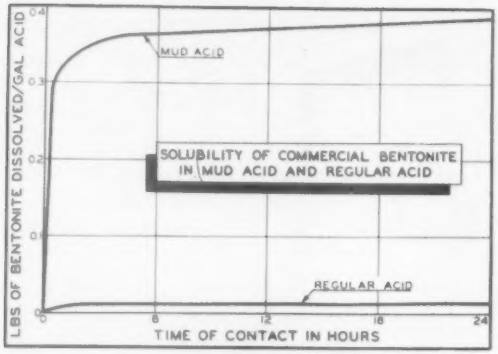

Fig. 1—Ordinary commercial bentonite, such as is used in the preparation of drilling muds, is many times more soluble in mud acid than it is in regular inhibited acid.

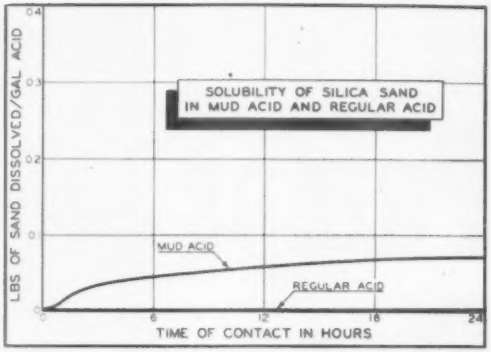

Fig. 2—Silica sand is much more soluble in mud acid than it is in regular acid; however, it is only about one-fifth as soluble in mud acid as is bentonite.

WELL COMPLETIONS

Mud-Acid Applications in Oklahoma

by E. H. Nielsen* and J. C. McCormick*

MUD acid is hydrochloric acid containing an addition agent which increases the solubility of silicates. As a result, this acid mixture will react with any residual mud cake, dissolving and disintegrating it and opening up formations for maximum production.

Mud acid contains various other addition agents, designed to impart special properties to the acid solution. Chemical inhibitors selectively protect metal casing, valves, pumps, or other well equipment. Surface-tension-lowering agents provide improved penetrating properties for the acid, and facilitate the return of the spent acid to the well bore. Demulsifying agents minimize the possibility of any emulsion formation between the spent acid and the formation oil.

Applications to Pay Formations

Most important use for this material is in the removal of mud sheaths left on the face of the pay formation following rotary-tool completions. Many times, casing has been perforated in a well opposite what, from all indications, should be good commercially producing pay, yet the well produces very little oil. The application of mud acid to such wells has resulted in highly satisfactory production increases in a large number of cases, indicating that the perforations or the face of the producing formation had been effectively blocked by mud.

*Dowell Incorporated.

Important treating factors . . .

1. **The well should be cleaned up as much as possible before the mud-acid application.**
2. **Mud, or water, should not be injected into the formation prior to, or following the treatment; oil or condensate should be used as displacement fluid.**
3. **Slow injection of the acid, resulting in excessive treating time, has in some cases proved harmful to the well.**
4. **The mud acid should be opposite the pay formation before injection pressures are applied; oil should not be injected into the formation preceding or simultaneously with the acid.**
5. **Immediate and rapid removal of the reaction products should follow treatment. If the well will not flow, it should be swabbed at once.**

Mud acid treatment also have a definite application in wells where the drilling mud has penetrated a considerable distance into the formation. In such cases, flowing or producing the well does not always remove the mud from the pores. The only satisfactory method of cleaning the mud out of these drainage channels is by chemical means.

Formations containing silicates and clay materials in the producing section also have been successfully acidized using mud acid.[1,2] By increasing the permeability of the "critical zone" (the formation in the immediate vicinity of the well bore, where fluid velocities and pressure drops are extremely high), the productivity of such wells has been materially increased.

Elk City and New Hope

Mud acid has been used in the treatment of wells to increase oil production in a number of producing areas in Oklahoma. It has been particularly effective in Elk City field and in New Hope field (Gibson sand). It has proved superior to ordinary hydrochloric acid for increasing water-injection capacity in the Osage County sand fields. Used as a cleaning solvent for sand formations when completing new wells or in reworking old wells with cable tools,

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Fig. 3—The treatment of a well with mud acid requires no special equipment, hookup, or preparation, other than that which would be employed in a conventional acid treatment of the same well.

mud acid has been productive of excellent results.

Other applications include cleaning off the formation face prior to a cement job in order that a better bond may be obtained.[3] The product has also proven to be a valuable aid in freeing stuck drill pipe during rotary drilling operations.[4]

Core tests . . . Before any treatments are conducted using mud acid, samples of the oil-bearing formation and drilling mud, if available, are tested in the laboratory. Comparative solubilities in hydrochloric acid and mud acid are conducted on samples of cutting to determine which type of acid will produce the most benefit in the well. If core samples are available, permeability tests are conducted before and after acid treatment. In this way, exact treating recommendations can be made, based on the conditions in the specific well.

For example, six cores from a well in Beckham County were submitted for analysis and recommendations for treatment. Permeability plugs were drilled from four of the cores. A satisfactory permeability plug could not be obtained from the other two cores. Permeabilities were run on these four plugs. Two of the plugs were then acidized with mud acid and the permeabilities redetermined. The remaining two plugs were first acidized with 15 per cent hydrochloric acid followed by mud acid. The permeabilities of these samples were then determined. The results are shown below:

Sample No.	Permeability of core samples		
	Original	After 15% HCl	After mud acid
1	< 1 md.		1,820 md.
2	< 1 md.		2,140 md.
3	10.8 md.	430 md.	2,860 md.
4	< 1 md.	370 md.	2,710 md.

These results indicated that mud acid application would prove more beneficial in this well than hydrochloric acid alone. The well was treated accordingly and satisfactory production increases obtained.

Muds . . . The following example is typical of drilling-mud tests conducted in the laboratory. Two mud samples were taken from drilling wells in Beckham County. Sample No. 1 was taken from a well drilling at 9,500 ft. and had been Tannex treated. Sample No. 2 was taken from a well drilling at 10,185 ft. and was Carbonox treated. A portion of each mud was dried and the solubility of the mud in 15 per cent hydrochloric acid and mud acid determined. The results of these tests are shown below:

Sample No.	Solubility of cuttings (per cent)	
	In 15% HCl	In mud acid
1	12	50
2	10	47
3	11	54
4	12	64
5	23	59
6	24	70

Sample No.	Per cent	
	Solubility in 15% HCl	Solubility in mud acid
1	21	84
2	23	81

Mud acid is much more effective than hydrochloric acid in dissolving clays and similar silicate materials present in drilling mud, due to its hydrofluoric acid content. Fig. 1 shows the comparative solubility curves of bentonite in hydrochloric acid and mud acid.

This property of mud acid is valuable in treating sand formations since it will remove clays and silicate materials from the formation which would remain undissolved during a conventional acidizing treatment with hydrochloric acid. Mud acid also possesses limited dissolving power for the sand grains of the formation, as shown in Fig. 2; however, the principal action is on the silicate binding materials in the sand.

Treating Procedure

Most mud acid treatments are made using the conventional Carr method of acidizing.[5] Specially built trucks and pumping equipment transport the product to the well and control its application to the proper production zone. The well is first filled with fluid, after which the mud acid is pumped down the tubing while bleeding off sufficient

TABULATION OF RESULTS OF ACID TREATMENT, NEW HOPE FIELD, GARVIN COUNTY, OKLAHOMA

Well	Field	Formation	Time from completion to acid	Amount acid used		Production data			Remarks
				M.A.	Wash A	I.P.	Before acid	After acid	
1	New Hope	Gibson	6 months	500	500	118	59	117	105 bbl. oil per day, 6 months after acid
2	New Hope	Gibson	5 days	500	500	67	62	39	75 bbl. oil per day, 2 months after acid
3	New Hope	Gibson	4½ months	500	500	114	35	175	107 bbl. oil per day, 4 months after acid
4	New Hope	Gibson	7 weeks	500	500	165	78	62	73 bbl. oil per day, 12 days after acid
5	New Hope	Gibson	5 days	500	500	119	63	69	68 bbl. oil per day, 7 days after acid
6	New Hope	Gibson	6 months	500	500	140	55	158	100 bbl. oil per day, 6 weeks after acid
7	New Hope	Gibson	1 month	500	500	122	83	122	114 bbl. oil per day, 1 month after acid
8	New Hope	Gibson	1 month	500	500	163	68	88	70 bbl. oil per day, 7 months after acid
9	East Lindsay	1st Bromide	15 months		1,000X	181	0	250	100 bbl. oil per day, 5 months after acid (Probably acidized dolomite)
10	S.W. Maysville	Bromide	Not completed	500	500	14	14	0	Temp. abd. Produced 27 bbl. net oil before dying.
11	S.W. Maysville	Gibson	7 weeks	500	500	133	10	47	38 bbl. oil per day, 2 months after acid

fluid at the casing head to spot the acid at the proper level in the well. The casing valves are then closed and the balance of the acid and an after-flush fluid are pumped into the tubing. This forces the mud acid into the desired zone where it can open up additional permeability to the well bore.

The "soaking" procedure is often used in wells that will fill with fluid and have tubing perforations set at the bottom of the producing section. In such cases, sufficient mud acid to cover the pay zone is spotted opposite this section and allowed to soak for 10 to 15 minutes. This is then bled up the hole and a fresh batch of acid spotted at the pay zone and allowed to soak 10 to 15 minutes. The spent acid is then bled up the hole and the remaining mud acid and wash is pressured into the formation.

From a study of results obtained in a large number of mud-acid treatments in Oklahoma, it appears that optimum results are obtained by a two-stage treatment. The formation is first cleared of carbonates by a 15 per cent hydrochloric acid solution, followed by mud acid to remove the less-soluble constituents.

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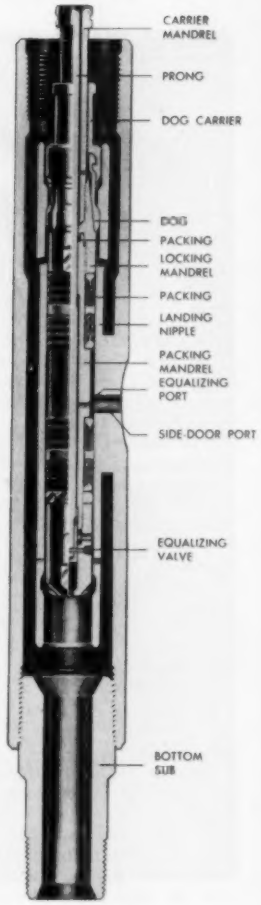
BOOKS

GEOLOGY. By O. D. Engeln and Kenneth E. Caster. Published by McGraw-Hill Book Co., 330 West Forty-Second Street, New York. 730 pp. $7.

Here is a text that really supplements the work of the teacher. In content it is comprehensive without being encyclopedic. It presents the facts of historical geology as an outgrowth of the understanding of physical geology. Narrative continuity is maintained throughout the test. Chapter and topic successions are logical. Content is divided two-thirds physical, one-third historical, instead of the traditional half and half. The book begins with a discussion of geologic phenomena familiar to the student—soils and rocks. Remote and speculative topics are treated at the end of the book. Each historical geology period is made distinctive, provided with an identity, and shown to have particular characteristics. The presentation of paleontology is given a somewhat more dynamic treatment than usual, aided by a completely new series of paleogeographic maps of North America for all periods, based on the latest data. Illustrations are outstanding, and many questions accompany the text to help the student strengthen his grasp on the subject.

announcing a new side-door assembly with a large by-pass for formation-fracturing



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CHECKED WASTE DISPOSAL LATELY?

A Good Waste-Disposal Program Makes Sense . . . *and Profits*

by William C. Douce* and James Word*

CONSIDER a hypothetical example that is typical of most small refiner's operations. The refinery in such case would be one in the crude-oil-charging-capacity range of 5,000 to 10,000 bbl. per day. Facilities for this hypothetical plant include a crude unit, a catalytic cracker, a thermal reformer, a light hydrocarbon-recovery unit, a small polymerization plant, and caustic treating equipment for gasoline and distillates.

Additional facilities include utilities of power, steam, air, and water, plus storage tankage for crude oil and finished products. A brief discussion of the wastes produced in this plant and suggested methods of handling these wastes should enable taking into account most of the waste-disposal problems of the small refiner.

Both large and small refiners alike, in analyzing air and water-pollution problems, are placing increasing emphasis on a fact that has been known for years. This fact is that many of the refinery wastes normally produced can be materially reduced at their source and, in some cases, almost entirely eliminated by improved operations, maintenance, and housekeeping. This means less capital investment and less operating expense in methods and equipment required to dispose of the refinery's wastes.

The success of a waste-reduction program has been surprising in many cases and is the basis for all well-planned waste-disposal programs. First, reduce the wastes to a minimum and then satisfactorily dispose of those that are produced.

Make plant surveys and weight balances on the refinery's operations, accounting for all materials coming into and going out of the plant. In this way, some idea of the magnitude of waste products and losses is gained. Also a logical beginning of a constructive air and water-pollution-abatement program is achieved.

Part of the plant survey procedure will be measuring and analyzing waste streams where possible. The liquid waste streams are particularly adaptable to examination. Analyze them under normal and abnormal conditions, analyze the stream or body of water into which the liquid wastes discharge to determine the change in composition caused by the wastes.

The more useful tests can be handled by the refinery's laboratory and include pH, alkalinity, suspended solids, and oil content. If more difficult tests are required, most of the major water treatment companies will make such tests for a reasonable fee.

Alert Employes

It is surprising how great a reduction of the wastes normally produced in a refinery can be made by the simple expedient of each employe keeping alert and cooperating to avoid producing waste materials. This is particularly true of oil losses to the waste-disposal system.

Improved maintenance includes a more thorough inspection and repair of minor leaks of any nature in starting up units after shutdowns for repair. It includes more frequent packing adjustment on pumps to reduce leakage, a more widespread use of mechanical seals on difficult pumping problems, and a greater emphasis on quick repair of new hydrocarbon, water, or chemical leaks.

Improved operation comprises the use of more effective startup and shutdown procedures, with emphasis being placed on emptying all vessels back to storage rather than dumping to sewers or slop systems. It means prompt reporting of new leaks in lines or vessels and the prompt reporting of leaky valves or inoperative level controls. It means using care in draining water off the bottom of oil-containing vessels.

A third phase of a waste-reduction program is improved housekeeping by the prompt cleaning up of all spills, keeping debris and trash hauled away, and maintaining the refinery area in a generally clean condition. This improved housekeeping program has the added advantage of creating a natural pride in the employes in keeping the place cleaned up. This improvement in the employe's attitude, in turn, results in his being more cooperative in maintaining improved maintenance and operating programs.

A final aspect of this emphasis on reducing or eliminating the refinery's wastes at their sources is the increasing effort by refiners to utilize the present markets for their waste products and to replace waste-producing processes with nonwaste-producing processes. Market demands have increased markedly for some of the refinery waste materials. The sale of these materials solves a disposal problem and, in many cases, is a profitable operation. For example, sulfur can, in many cases, be economically recovered from hydrogen sulfide-containing gases and from sulfuric acid sludge; some spent caustics are in demand and spent catalysts such as phosphoric acid are salable.

As for process substitution, when process units become obsolete and are ready to be retired, it may well pay the refiner to switch to another process even at a possibly higher capital investment cost. For example, a regenerative amine-treating unit might replace a nonregenerative caustic-scrubbing unit for hydrogen sulfide removal or phenol treating might replace acid treating of lube-oil stocks.

After a thorough effort to reduce the refinery's wastes to a minimum, the problem remains of disposing of the waste products that are unavoidably produced. There are numerous methods of disposing of each of the waste streams and the choice depends upon the individual refinery.

There are methods and equipment which can be used to meet average air and water-pollution standards at minimum expense. The methods suggested are thoroughly described in the American Petroleum Institute's Manual on Disposal of Refinery Wastes. This manual is an excellent reference on this problem.[4]

Wastes produced from the hypothetical small refinery classify them-

*Phillips Petroleum Co. From paper presented at Western Petroleum Refiners Association meeting, Detroit, August 1952.

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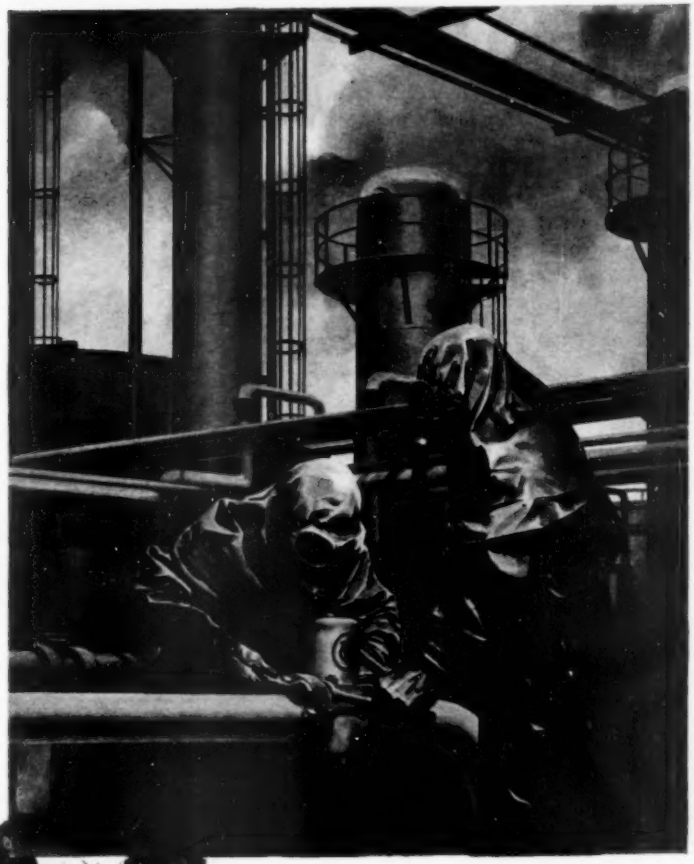

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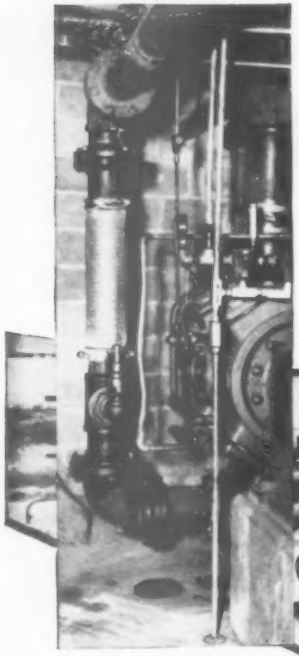

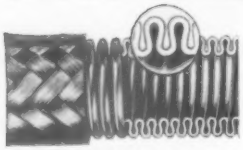

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"Market demands have increased for some refinery waste materials, sale of which solves disposal, and yields a profit."

selves into liquid pollutants and gaseous pollutants. The liquid pollutants comprise oil-containing waters, chemical wastes, sanitary sewage, and solid-bearing wastes. The gaseous pollutants, while relatively few in number, can be troublesome, particularly from an odor and comfort standpoint. They comprise smoke and combustion products from the furnace stacks and plant flares, catalyst dust from the catalytic cracking unit, and hydrogen sulfide and mercaptan vapors particularly from caustic regeneration.

Liquid Wastes

One cardinal principle of the modern refinery waste-disposal system is complete segregation of sewer gathering systems for the different types of liquid wastes. The most important feature of the segregation of liquid wastes is to keep chemical wastes, sanitary sewage, and solids-bearing wastes, such as water-treating sludges, out of the oily-water waste system. These nonoily wastes create and stabilize oil-water emulsions thereby decreasing oil recovery, increasing oil losses, and increasing the amount of oil in the waste effluent from the plant. These emulsions mean additional expensive treating to avoid stream pollution and excessive oil losses.

Oil-Containing Wastes

Oily-water wastes include cooling tower blowdown, pump-gland flushing water, process steam condensate, run-tank waters, crude desalting brine, and slop oils.

Most small refiners rely on a sewer gathering system for collecting oily wastes which discharge into an oily-water gravity separator or trap. The oil is separated by gravity and skimmed off the top with the relatively clean water being discharged from the refinery into nearby surface waters. This method of disposal is usually acceptable in most small refineries, if the separator is adequate in size and the forming of oil-water emulsions is kept to a minimum by waste segregation.

There are many separator designs in use today covering a wide range of cost.[5] The most efficient design is the new one recommended by the A.P.I. which is the result of a recently completed 3-year sponsored research program at University of Wisconsin on gravity separator design.[6] This design is simple as compared to most separators now in use. Its cost can be reduced for the small refiner's use by substituting any one of several good manual oil skimmers for the automatic oil skimmer and sludge-removal facilities used on larger installations.

This new design will appear in the fourth edition of Volume I of the A.P.I. Manual on Disposal of Refinery Wastes, which is to be published late in 1952. The most important aspect of a gravity oil-water separator is regular operation and maintenance to keep the oil skimmed off and sludge removed from the bottom.

In some localities where the receiving body of water for the separator effluent is relatively small, some additional polishing treatment may be necessary to remove the last traces of oil. The most inexpensive method of removing these last traces of oil is the use of a hay filter. However, these filters are of relatively little value unless changed frequently. Other more expensive methods of removing these last traces of oil include chemical flocculation and air flotation.[7,8]

Almost all refineries experience the formation, to some degree, of oil-water emulsions which have to be removed from the gravity separator and handled separately. The problem of treating emulsions is often an individual problem for which no single recommended method of treatment can be given. However, many of the emulsions encountered can be broken by heating them in a tank by means of steam coils to approximately 200° F. with the oil being drawn off to storage and the water layer returned to the separator inlet.

In some cases, the addition of any one of several well-known emulsion-breaking chemical compounds may help to break emulsion. Emulsions which do not yield to this simple treatment are usually lagooned or ponded. Examples are heavy emulsions such as found in the bottom of gravity separators and tank bottoms. More complete information on handling of emulsions may be found in the literature.[9,10]

Chemical Wastes

Chemical wastes normally produced in the above-described small refinery include spent caustics, possibly lead sulfide wastes from doctor treating and perhaps sulfuric acid sludges from acid treating of distillates or lube-oil stocks. In addition, there would be spent polymerization catalyst, possibly in a solid form depending upon the particular type of polymerization catalyst used.

The effects of chemical wastes in refinery waste waters upon the surface waters into which the waste waters are discharged will depend upon the composition of both the waste waters and receiving waters. In many cases, they are not considered to be pollutants while in others they are objectionable because of the odor, taste, toxicity, color, and oxygen demand.

Spent caustics and lead sulfide wastes are known to be strong pollutants and often present a knotty disposal problem. The disposal by the most direct method is usually the simplest and least expensive.[11] Ponding, while not considered a generally recommended practice, is often quite applicable for the disposal of small quantities of waste caustics. Spent caustic is often oxidized and stabilized by storage in open ponds to such an extent that later disposal by dilution becomes possible. Care must be taken in the selection of location to prevent the creation of an atmospheric or water-pollution problem.

Another method of disposal is into large bodies of water or large rivers where dilution is almost infinite. Dilution is the most common method practiced today, but probably the most abused. The extent to which dilution can be safely used varies widely. Each refinery must study this problem in the light of local existing conditions.

A third method sometimes used is by sale of the caustic. Caustic containing sulfides, phenolates, cresolates, and sometimes carbonates are the most readily marketable.[11] These methods are the least expensive and are usually suitable for most small refineries. There are numerous more expensive chemical methods for the disposal of spent caustics which can be used if the situation demands.[11]

The disposal of sulfuric acid sludges usually constitutes a serious disposal problem. Including this waste in the refinery effluent stream may give an undesirable pH and will certainly introduce objectionable odor and taste-producing compounds.

In refineries where the amount of acid sludge is small and where alkaline waste is present, these two products sometimes can be mixed to neutralize each other and obtain a fairly acceptable effluent which may be disposed of by dilution. This method is not always applicable because one of the waste products may contain oily material which may emulsify or dissolve in the resultant effluent. The product mixing must also be such that it does not affect waste-water separator operation.

Where the sludges contain sufficient

"Better public relations and improved community relations."

combustible material, another disposal method is to use them as fuel, either alone or mixed with an additional quantity of fuel oil. This method of disposal is a simple operation and has been used by several refineries with considerable success. Constant supervision of combustion conditions is essential so as to minimize emission of dense smoke.

If the sludge cannot be disposed of by neutralization and dilution or by burning it the only other relatively inexpensive method of disposal is by burying it. There are also processes now developed for recovering either sulfuric acid or sulfur from sulfuric acid sludges which require substantial capital investment but at the same time provide a monetary return.[11]

Spent polymerization catalyst such as solid phosphoric acid catalysts are frequently dumped on land. The site for the dumping land should be well isolated because these catalysts are deliquescent and, when exposed to the atmosphere, the absorbed water will leach the acid from the catalyst. The first line of attack on this problem should be to investigate the sale of this material, as spent phosphoric acid catalysts are in demand by some of the fertilizer-manufacturing companies. The monetary return is not large, but the disposal problem is eliminated. Another method of disposing of the waste is to spread the material into pits filled with lime, limestone, or oyster shell, in order to neutralize the waste.[11]

Sanitary Sewage

In many plants sanitary sewage is a disposal problem. Treatment of this material is beyond the scope of this paper and a local or state health department can furnish standard methods for disposal. The main consideration is that this material not enter the oil-recovery system for reasons previously mentioned.

Solid-Bearing Streams

Solid-bearing liquid wastes in a refinery include ground surface drainage and runoff waters containing dirt and rubbish, water-treater sludges, and boiler-blowdown streams. These wastes normally are not considered pollutants in most surface waters as they are not toxic or objectionable in any way. Only in rare situations will ponding or filtration be necessary on the water-treater sludges and the boiler-blowdown streams. It is important to see that none of these streams enter the oily-water disposal system as they strongly promote the formation of oil-water emulsions as previously mentioned.

Gaseous Products

Combustion products, other than smoke resulting from the burning of refinery fuels or burning of hydrocarbons in the plant flares, rarely cause trouble because of the dilution effect of the atmosphere.[12] The bulk of the gaseous wastes produced in the plant will be these combustion products. Some high-sulfur fuels may result in excessive discharge of sulfur compounds to the atmospheres in some locations.

Smoke

Smoke is perhaps the most obvious gaseous pollutant from a small refinery, and many localities have statutory limits on the intensity of the smoke discharge. Several good smokeless flares have been designed using steam or water injection and are relatively inexpensive. Simple steam or water injection into presently built flares, during periods of peak flare load, can be used to reduce smoke, although not being as efficient as a completely designed smokeless flare would be. There has been a good deal of work done on this subject in the past few years which is described in the literature.[12 13]

Catalyst Dust

Most catalytic cracking units include in their original installations proper facilities for prohibiting excessive discharge of catalyst dust. These facilities include both mechanical and electrical precipitators. The economics of the process require the control of the catalyst losses down to a level that meets most present requirements on discharge of catalyst dusts. In those locations where additional measures must be taken, both water and oil scrubbers have been used successfully to reduce the discharge of catalyst dusts into the atmosphere.[12] These methods are not inexpensive, however, to the small refiner.

Disposal of spent catalyst withdrawn from the system to maintain catalyst activity is not properly a gaseous waste. However, it is discussed here as it can become an air pollutant if dumped promiscuously on the ground as is done in some cases. Some refiners dispose of it by using it as a fill material, making sure to cover it after each dumping operation with a layer of earth to prevent blowing, as it is finely divided material. In some locations, it is wetted with water and discharged to a river or stream. Spent catalyst also has been mixed with asphalts and sprayed around tank dikes in the refinery as a surfacing material.

Hydrogen Sulfide and Mercaptans

Hydrogen sulfide and mercaptan vapors are usually discharged in objectionable quantities from a small refinery by the regeneration of caustic from gasoline treating. One simple and inexpensive method of disposing of these odorous gases is to collect them and burn them either in process furnaces as fuel gas or in waste gas furnaces or flares, with the resultant conversion of these gases to sulfur oxides.

A final analysis shows that the need for air and water-pollution abatement is a public-relations problem and the method of pollution abatement is a technical problem. The legislative trend is clearly indicated and, at the same time, it is obvious that a complete solution to the problem will take a great amount of money and a good number of years.

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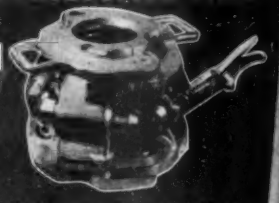

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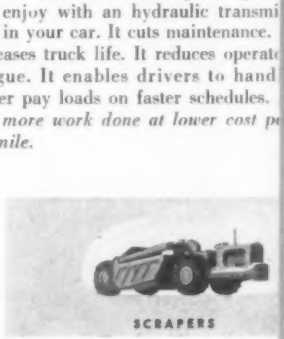

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Interrelation Between (1) Terminal Design, (2) Operation, and (3) Deliveries

Here's how Indiana Standard operates its products carriers. Accurate metering is a prime consideration. Included is a useful graph for determining tank size

by Ralph B. Rodgers* and Spencer A. Hallberg*

THE Standard Oil Co. (Ind.) products pipe lines are used exclusively for the transport of the company's own products. The lines are operated as a plant facility connecting the refinery supply to the distribution terminals. Products-pipe-line department employes are responsible for all station and line operations; certain operations occurring at terminals are a joint operation with the sales department.

What would commonly be considered pipe-line functions at terminals, such as batch changes, meter readings, meter tests and maintenance, and the hourly reporting to the dispatching office, are handled by sales-department terminal operators. The operators' regular duties of loading trucks are augmented by the pipe-line operations. Therefore, there is no need for pipeline deliverymen at terminals.

Pipe-Line Metering

Since products-pipe-line operations started in November 1939, positive-displacement meters have been used for measuring the input and output of products at all points. The meters are almost all of the rotary type, with an accuracy of approximately 0.1 per cent claimed by the manufacturer. In the 12 years of operation, the line overage or shortage has been considerably below the calibration accuracy stated above.

The accurate metering of products improves both the operating department's control over product movement and the accounting department's record of its disposition. Obtaining accurate hourly figures of pumping and receipts makes it possible for the dispatcher to calculate the arrival time of products at terminals with a greater degree of accuracy and to sense small line leaks even when pressures do not indicate a loss of product.

The accuracy of positive displacement meters hinges on meter maintenance, meter tests, and the accuracy of the prover tanks used for meter calibration. With effective maintenance of meters and related equipment, a necessity for efficient pipe-line operation, obtaining maximum accuracy from the meters is, to a considerable extent, contingent on the method and frequency of proving meters.

Any procedure for making meter tests should give accuracy without overburdening the operator with unnecessary work. Depending on the type and size of meter in use, a certain volume can be delivered through it, between calibrations, without noticeably affecting accuracy. The following tabulation reflects the company's views of the maximum allowable volumes between meter calibrations for positive displacement meters ranging from 2 to 6 in. in size:

MAXIMUM VOLUMES PERMITTED THROUGH A METER BETWEEN METER PROVINGS

Size of meter (in.)	Barrels
2	12,000
3	30,000
4	40,000
6	60,000

The following procedure is used for determining when a meter test shall be made:

1. Each meter used is tested near the center of every batch, providing the volume of the batch through the meter is less or equal to the quantity specified in the above tabulation. If the portion of the batch through a meter is greater than the maximum allowable volume, the meter is tested for each additional increment of product equal to (or less than) the maximum allowable volume.

2. Whenever more than one test is required, tests are spaced so as to divide the batch in approximately equal segments. For example: If a batch of 60,000 bbl. is passing through one meter and the maximum allowable volume is 40,000 bbl., then two tests are made, one near the 15,000-bbl. point and the second near the 45,000-bbl. point in the batch.

For further illustration: If a batch of 270,000 bbl. is passing through two meters and the maximum allowable volume between meter tests is 60,000 bbl. for each meter, then each meter is tested three times during the batch at approximately the 45,000, 135,000, and 225,000-bbl. point in the batch.

3. If more than one meter is used to deliver the batch through a particular point, meters are balanced to handle approximately equal portions of the flow. Additional meter tests are made when, in the judgment of the operator, they are necessary because of abnormal operating conditions or suspected meter failure.

Before placing a meter back into service after adjustment or repair, a range test of meter accuracy is made. Tests are made by one delivery each, into the prover tank, at rates of one-quarter, one-half, and three-quarters of the rated capacity of the meter. After adjustment the per cent of meter error should not vary more than 0.2 per cent between each rate of flow. When the factor varies from 1.0000 by more than 0.0075 per cent on any product, a calibration adjustment is made to bring the reference factor as near 1.0000 as practical on both oils and gasolines.

On meter tests an effort is made to duplicate actual line flow conditions. Test flows are regulated into prover tanks as nearly as possible at the same meter-case pressure and rate as prevail during the batch. For good results, variation in rate of flow should not exceed 5 per cent. This is determined by stop watch. Meter-case pressure variation between actual and prover tank flows should not exceed 10 per cent for pressures up to 75 psi. and 5 per cent for greater pressures.

The prover tank is first filled and emptied to wet the inside surface of the tank. Test deliveries are then made to the prover tank until the differen-

*Standard Oil Co. (Ind.). Presented at products pipe-line conference, A.P.I. Division of Transportation, Fort Worth, 1952.

tial between two consecutive tests does not exceed 0.05 per cent. The average of the factors obtained in the tests is used as a correction factor for the meter reading. When emptying the prover tank after each filling, 2 minutes is allowed for drainage after the stream has stopped flowing or reached the lower zero mark.

Pipe-Line Prover Tanks

To test a meter, deliveries are made to an accurately calibrated prover tank generally large enough to contain the maximum flow through the meter for a period of approximately 2 minutes. Prover tanks now in use range in size from 10 to 30 bbl. and are installed according to the volume requirement. Each prover tank is recalibrated at least once a year.

Master test vessels of 50-gal., 5-gal., and 1-gal. capacities, tested and sealed by the U. S. Bureau of Standards, are used in the tests. The prover tank is usually erected in the open or in an unheated building. Occasionally it is erected in a building that can be heated to a point just below freezing. The difference between atmospheric and product temperature is minimized as much as possible.

Whenever possible, the calibration of the prover tank, which is done with water, is made on a day when a reasonably uniform temperature can be maintained throughout the calibrating period.

This procedure is used for calibration of the prover tank:

1. Before calibration, the prover tank is filled with water to wet the inside of the tank. Water is then drained off, allowing 90 seconds for drain down after the stream has stopped flowing or reached the bottom "zero."

2. Through use of the master test vessels, previously referred to, the prover tank is filled with water through the top opening.

3. The liquid level of the gage scale on the filled prover tank is recorded after the exact gallonage has been measured into it. The exact gallonage is the amount required to fill the nominal capacity.

4. To keep the effects of thermal expansion of the water to a practical minimum, the average temperature of the water in the prover tank should not exceed the differences shown below. If they do, a correction is made. Increases in temperature will result in increases in volume and conversely decreases in temperature will produce decreases in volume. Temperatures should be adjusted as follows:

(a) If the temperature of the water used is between 32° and 50° F., and if the temperature of the water in the full prover tank is within the same range, no correction need be made.

(b) If the temperature of the water used and the temperature of the water in the full prover tank is between 50° and 68° F., a differential of 4° F. may take place before correction is necessary. In this range, the correction factor per degree change shall be 0.0070 per cent.

(c) If the temperature of the water used and the temperature of the water in the full prover tank is between 60° and 70° F., a differential of 3° F. may take place before correction is necessary. In this range, the correction factor per degree change shall be 0.0106 per cent.

(d) If the temperature of the water used and the temperature in the full prover tank is between 70° and 90° F., a differential of 2° F. may take place before correction is necessary. In this range, the correction factor per degree change shall be 0.0154 per cent.

5. After correcting for differences in temperatures, the test is repeated until two successive tests are obtained which agree within 0.02 per cent of the nominal tank volume and the average of the two are accepted as being correct. The gage scales are then marked and sealed.

6. The zero reading for the nominal tank capacity should be at approximately midpoint of gage scale.

Accounting for stocks . . . To account for the quantity of products pumped from refineries or received by terminals, the temperature of the batch is observed at the start and end of the run and hourly during its passage. When the hourly temperature observations are made, meter readings are taken for dispatching check purposes. From this information, the amount of the batch received for each whole degree of temperature is recorded and the volume for each reading is then adjusted to 60° F. by the use of National Bureau of Standards Circular C-410 correction factors.

The summation of the volumes at 60° F., divided by the summation of the unadjusted volumes, provides a weighted temperature correction factor which is then applied against corrected meter readings for billing.

Terminal shipping facilities . . . All terminals are designed and operated for shipment by truck or tank car. Due to the many types and capacities of truck tanks it is necessary to equip truck-loading docks with meters for accurate and efficient measurement of product volume.

Because all loadings are made through meters, docks and meter-proving facilities are standardized.

Terminal prover tanks . . . Portable prover tanks are used for proving the accuracy of all loading-dock meters. Meter-proving equipment is designed to conform with the Petroleum Positive Displacement Meter Code, adopted by the American Society of Mechanical Engineers and the American Petroleum Institute. Likewise, prover tanks are designed and equipped so that tests will simulate operating conditions of temperature, pressure, rate of flow, and type of loading equipment.

Prover tanks are of sufficient capacity to contain the maximum actual truck loading flow rate of the largest meter in use, for a period of at least 1 minute. It is general practice to utilize prover tanks having a minimum capacity of 500 gal. even though the operating flow rates do not require a tank of that capacity.

Terminal dock metering . . . For several years the policy was followed of testing meters every 60 days or every 1,000,000 gal. throughput, whichever occurred first. Because of operation under favorable conditions, with closely controlled line pressures and flow rates, few adjustments were required. As a result all loading-dock meters are now tested twice a year—in the second and fourth calendar quarters.

These particular periods were chosen primarily because they precede the two periods of high shipping volume. Every month all meters are checked by terminal superintendents, who compare the liquid level in a vessel (truck compartment) of known capacity with the quantity recorded on the meter. Similarly, loaders are requested to observe the liquid level of the product in relation to the affixed capacity markers in the vessel being loaded. If differences are disclosed by such visual checks, the meter is taken out of service and a complete test and the necessary adjustments are made.

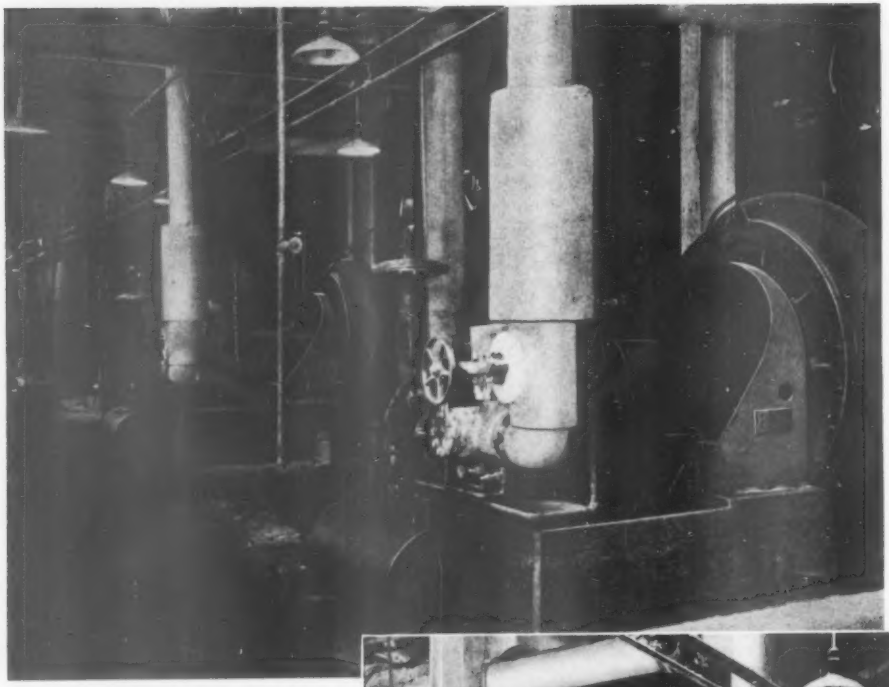
Before actual testing of the meters, the inside of the prover tank is thoroughly wetted and the lines to the prover tank filled with the product to be tested.

Actual testing procedure in sequence enumerated is:

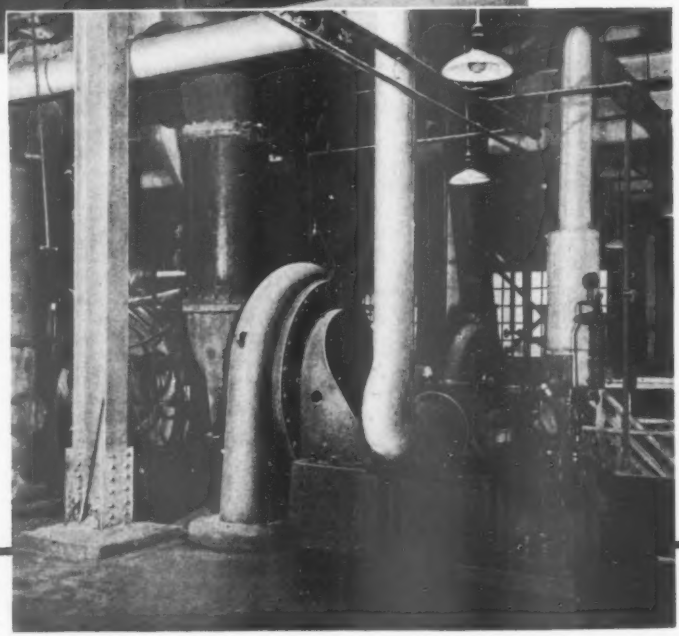
1. Allow 60 seconds "drain-down" time after stream has stopped flowing before closing bottom drain cock to provide uniform drainage. Leave test pet cock open on discharge side of bottom drain cock to detect any valve leakage while testing.

2. Determine that the vacuum break-

Twenty years pulling



Part of the line of Elliott turbine-driven single-stage blowers serving continous filters at the Carlsbad plant.



Another view of the blower line. Discharge nozzles point down.

P2-2

brine-laden air!

ELLIOTT *Centrifugal* BLOWERS

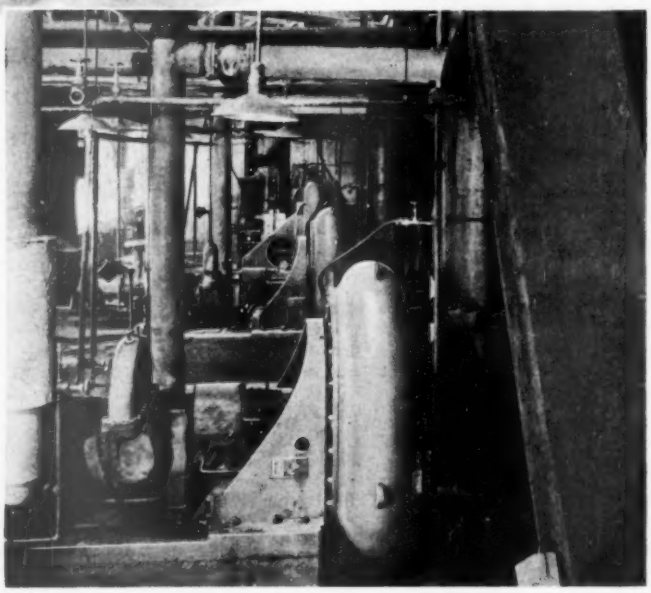
General view of the U. S. Potash Company plant at Carlsbad, N. M.

began serving the U. S. Potash Company of Carlsbad, New Mexico, in 1932, when the first of the present eleven Elliott turbine-driven blowers was installed.

Consider the type of service — round-the-clock operation, 363 days per year, handling air that is saturated with brine resulting from the hot solution leaching process used in separating potassium chloride from the sodium chloride and other impurities with which it is found. After crystallization of the potassium chloride in the solution, it is filtered, during which the Elliott blowers located at the suction end of the filters draw heated air through the filter drums. The possible corrosive action of the brine-laden air is minimized by impellers of special alloy.

It is significant that twenty years of this rigorous service, with only occasional outage for maintenance, has no terrors for Elliott blowers. The original unit is still going strong.

Elliott engineers will be glad to discuss your blower needs.

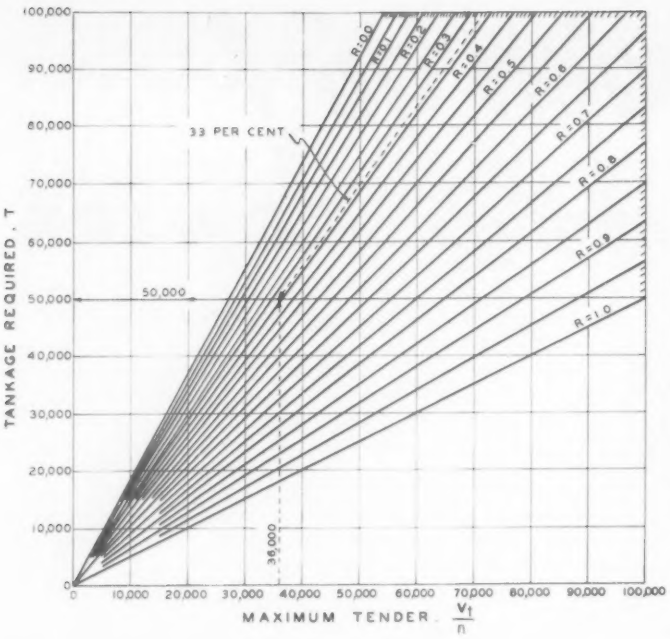


The line of eleven blowers used in potassium chloride separation. Each blower is rated 12,640 inlet cfm, with an inlet pressure of about 23.0 in. Hg, absolute, discharging to atmosphere (barometer 26.5 in. Hg) and is driven at 3670 rpm by an Elliott steam turbine developing 160 hp.

ELLIOTT Company

Centrifugal Blower Dept.
Jeannette, Pa.

Plants at: JEANNETTE, PA. • RIDGWAY, PA.
AMPERE, N. J. • SPRINGFIELD, O. • NEWARK, N. J.
DISTRICT OFFICES IN PRINCIPAL CITIES



Determination of Tank Size by Graph

To represent the tankage formula graphically, it is necessary to omit allowance for the two nonshipping days for week-end arrival of product ($V_t/15$). This amount must be added to the volume determined from the graph in order to select proper tank size exclusive of outages (tops and bottoms). Graph is constructed by using the maximum tender as abscissa and tank volume required as ordinate with a series of curves representing the portion of time the terminal will receive the product.

Numerical Example

The following example explains how the size of a terminal tank is determined by the graphical method:

Problem: To calculate size of tank required for heater oil No. 1 at Terminal "X."

Conditions:

1. Maximum monthly volume of heater oil No. 1 to be shipped from Terminal "X" = 72,000 bbl.

2. Total monthly volume of heater oil No. 1 pumped through the pipe line immediately upstream from Terminal "X" = 300,000 bbl.

3. Total monthly volume of all products to be pumped through the pipe line immediately upstream from Terminal "X" = 900,000 bbl.

4. Normal number of tenders of the product to be pumped during each month = 2.

(In a 30-day month, with two tenders per month, tenders are 15 days apart.)

Tank size is selected by graphical method by determining (1) the maximum tender V_t/n and (2) the portion of the month terminal receives the product $V_t/V_L = R$. Using example above:

$$\frac{V_t}{n} = \frac{72,000}{2} = 36,000$$

$$R = \frac{V_p}{V_L} = \frac{300,000}{900,000} = 0.333$$

Read across bottom of graph, "Maximum Tender Size," to 36,000 and then vertically to intersect a line where R equals 0.333; thence, from this point of intersection horizontally across graph to read volume as 50,000 bbl. Since the graph does not include the two nonshipping days, we must add 4,800 bbl. to determine volume to be 54,800 bbl. (exclusive of outages).

Nonshipping days = $V_t/15$.

$$\frac{V_t}{15} = \frac{72,000}{15} = 4,800$$

The tank size as determined by this method will adequately handle volumes for all months regardless of seasonal changes.

Preparation of Charts

In the preparation of graphs for tankage, using the method outlined here, the procedure and requirements are:

1. Assume maximum tender of 100,000 bbl.

2. Find tankage required by substituting various values of R (portion of month terminal receives stock) in tankage formula.

3. Plot values determined in (2) on 100,000-bbl. ordinate.

4. Draw lines from points plotted in (3) to the original point of the abscissa and ordinate axes.

---

er at the loading valve, in the fill-line for prover tank, is closed.

3. Reset meter counter to zero. Read and record totalizer meter reading on test form.

4. Set automatic stop on meter for the calibrated nominal capacity of the prover tank and start the loading pump.

5. Open valve at meter and loading valve at prover tank. Automatic meter operation fills prover tank at full flow to within a few gallons of capacity, depending on size of meter, then slows down the flow and smoothly stops meter at the nominal capacity of prover tank. Rate of flow at midpoint of test is timed by stop watch and recorded on the test form.

6. Close loading valve to prover tank immediately after the automatic meter stop has shut off the flow.

7. Open vacuum breaker at loading valve to allow loading line to drain below valve.

8. Record meter counter and totalizer readings on test form.

9. Record reading of scale on prover tank on test form. (Scale provides reading in both cubic inches and per cent of prover tank capacity.)

10. Note and record atmospheric and product temperatures on test form.

11. Open drain valve on prover tank and drain tank completely. Allow 60 seconds drain-down time as above, before closing bottom drain cock.

After the line wash and preliminary wetting down of the tank, two careful tests are made before attempting to adjust the meter.

Accuracy specifications require that these two tests must check to within 0.04 per cent of each other within minus (smaller volume than recorded by meter) 0.04 per cent or plus (larger volume than recorded by meter) 0.06 per cent of the "zero" mark on the prover tank scale. From a customer

viewpoint, the accuracy of the metering equipment would permit an overage of only 3 gal. on a 5,000-gal. transport load and would permit a shortage of only 2 gal. on a 5,000-gal. delivery. These differences are so small that they can hardly be measured in the transport truck tank or the destination storage tank.

If the two tests do not come within 0.04 per cent of each other, an investigation is made to determine whether the meter needs servicing or whether a mistake or carelessness is responsible for the variation in quantities delivered into the prover tank.

If the two tests come within 0.04 per cent of each other but not within minus 0.04 per cent or plus 0.06 per cent of the zero mark on the prover tank scale, the meter "calibrator" is adjusted and pairs of additional tests run until accuracy specifications are met.

When these required accuracy specifications are met, the meter is considered satisfactory and is sealed.

A separate test form is maintained for each meter, and because it is a continuous record, it provides all the pertinent data regarding tests made and adjustments required. This form will furnish a complete historical record of meter performance.

Computing Tank Sizes

Since cost of terminal tankage is a major item in the initial investment of the products pipe-line terminals, it is important that consideration be given to erecting tanks of the proper size at each terminal. It is essential that a tank size be provided that allows for future increases in terminal throughput, as well as tank working room for operation of the line under adverse conditions, without erecting excessive tankage.

With costs and pipe-line operation in mind, a formula, based on operating experience, has been derived by the products-pipe-line department of Standard Oil Co. (Ind.). It is currently in use for tankage calculations. This formula provides a safe minimum tank size to handle required terminal volume, provides tankage for foreseeable increases in terminal throughput and permits a reasonable number of tenders each month.

Basis of Method

One tank is usually provided for each product at a terminal and the formula is developed from this basis. However, if it is desirable to construct more than one tank for a specific product at a terminal, the total tank volume determined from the formula, before adding space for tank bottoms and outage at top, can be divided by the number of equal volume tanks desired.

The proper tank size for a specific product at a terminal is obtained by an analysis of a 5-year forecast of estimated volume requirements in order to allow for future demands. The volume selected is the maximum estimated to be shipped from the terminal in any month during such period; and the corresponding pipe-line receipt for that month.

To calculate tankage by the formula the following data are required:

1. Maximum monthly volume of the product to be shipped from the terminal.
2. Total maximum monthly volume of the product to be pumped through the pipe line immediately upstream from the terminal.
3. Total maximum monthly volume of all products to be pumped through the pipe line immediately upstream from the terminal.
4. Number of tenders of the product to be pumped during each month.
5. Allowance of tank space for overshipment of product by terminal (estimated to be one-third of the terminal requirement between receipt of tenders).

A terminal will usually overship during certain periods of the month, a condition which may be caused by such factors as unfavorable weather forecasts, threatened strike, or upward price adjustments.

6. Allowance of tank space for undershipment of product by terminal (estimated to be one-half of the maximum tender to be delivered to terminal).

When a product tender is pumped into a pipe line, each terminal must have sufficient tank space available to hold its proportional share of the total tender in the event of bad weather, reduced demand, inability to ship, strikes, etc. Operating under this principle avoids a line shutdown during localized adverse conditions which would disrupt receipt of needed stocks at terminals operating under normal conditions.

7. Allowance for arrival of product on nonshipping days (week-end arrival). Calculated by multiplying the daily average shipping rate by two.
8. Allowance of outages for tops and bottoms. Outages are added after proper tank size is determined, since allowance varies with diameter and type of tank. (Normally a total of 3 ft. of space is allowed for tops and bottoms of cone-roof tanks and a total for 4 ft. of space for tanks of the floating-roof or lifter type.)

Development of Tankage Formula

Symbols to be used are as follows:

V_t = maximum monthly volume of the product to be shipped from terminal in barrels.

V_p = total monthly volume of the product to be pumped through the pipe line immediately upstream from terminal in barrels.

V_L = total monthly volume of all products to be pumped through the pipe line immediately upstream from terminal in barrels.

n = normal number of tenders of the product to be pumped during each month.

$R = V_p/V_L$ portion of month the terminal will receive the product.

Q_1 = quantity required between tenders.

Q_2 = quantity required for undershipments.

Q_3 = quantity required for overshipments.

Q_4 = quantity required for week-end arrival of product.

T = total working tank volume required (excluding tops and bottoms).

Derivation of Formula

T = quantity required between tenders, plus one-half maximum tender (undershipments), plus one-third quantity required between tenders (overshipments), plus quantity shipped in 2 days (week-end arrival):

$$T = Q_1 + Q_2 + Q_3 + Q_4$$

Q_1 = quantity required between tenders.

The maximum monthly volume of the product to be shipped from terminal (V_t) minus quantity shipped from tank while receiving product ($V_t \times (V_p/V_L)$ or $V_t \times R$) divided by number of tenders of product pumped (n)

$$= \frac{V_t - (V_t \times R)}{n} = V_t/n - V_t/n \times R$$

$$= (V_t/n)\,(1 - R)$$

Q_2 = undershipments.

One-half of maximum terminal volume on specific product (V_t) divided by number of tenders (n) = $1/2\ (V_t/n) = (V_t/2n)$.

Q_3 = overshipments.

One-third of quantity required between tenders (Q_1) = $1/3\ Q_1 = 1/3\ (V_t/n)\ (1 - R) = (V_t/3n)\ (1 - R)$.

Q_4 = week-end arrival—2 shipping days.

Volume from terminal (V_t) divided by 30, multiplied by $2 = V_t/30 \times 2 = V_t/15$.

Since:

$$T = Q_1 + Q_2 + Q_3 + Q_4$$

Then:

$$T = (V_t/n)\,(1 - R) + V_t/2n$$

$$+ (V_t/3n)\,(1 - R) + V_t/15$$

$$= (V_t/n)\,(1 - R + 1/2 + 1/3 - R/3)$$

$$+ V_t/15$$

$$T = (V_t/n)\,(11/6) - (4R/3) + V_t/15$$

Note: Formula for T is not factored further because graph is plotted with V_t/n as abscissa.

BOOKS

GUIDEBOOK, JOINT MEETING A.A.P.G., S.E.G., S.E.P.M., LOS ANGELES, MARCH 1952. Published by the Pacific Coast Section of American Association of Petroleum Geologists, and for sale by the secretary, Rufus Smith, Continental Oil Co., Edison Building, Los Angeles. 290 pp. $6.50.

This guidebook contains 88 maps, 83 cross-sections, 29 stratigraphic or correlation charts, and 11 photos. It also contains road logs of 670 miles of road. There are short illustrated papers on 65 California oil fields, and several papers on regional geology.

A TEXAS WILDCATTER. By Lucille Glasscock. Published by the Naylor Co., San Antonio, 126 pp. $2.50.

This is a biological account of Gus Glasscock and his career in the oil industry, written by his wife, who has shared his triumphs, his failures, and his dreams. The Glasscocks were a circus family, but with World War I over, Gus Glasscock headed for the oil fields—Ranger, Desdemona, Burkburnett, East Texas. And later, offshore drilling in the Gulf of Mexico. Here is an account that will appeal to many old-time oil men, and to younger ones as well.

A REPORT TO THE WHITE HOUSE

2—Oil and Gas as Chemical Raw Materials

From "A Report to the President of the United States by the President's Materials Policy Commission, June 1952"*

WITHIN the last 25 years hydrocarbons from petroleum and natural gas have become a source of raw materials for more than 2,500 different chemical products. With our increasing population and expanding economy, increasing mechanization, travel, transportation, and military demands, we shall require much more natural gas and petroleum in the future both for energy and for chemicals.

There appears to be no serious problem, however, of inadequate hydrocarbon reserves. Our proved crude-oil reserves have increased in spite of increased yearly production. Our ultimate oil reserves under the United States land areas may range between 500 and 1,000 billion barrels and—if we include the United States continental shelves—our ultimate reserves may be doubled.

Our natural gas reserves have been very conservatively estimated at 500 trillion cubic feet.

Chemical Intermediates

The quantities of paraffins, olefins, aromatics, and sulfur which would be available for chemical conversion were calculated on the basis of an estimated petroleum production of 2.5 billion barrels in 1955, 3 billion in 1960, and 4.5 billion barrels in 1975; and on an estimated natural-gas production of 9.2 trillion cubic feet in 1955, 11.4 trillion cubic feet in 1960, and 18 trillion cubic feet in 1975. The estimated availability of intermediates for chemical conversion in the years 1955, 1960, and 1975 is shown in Table 1.

*Original report to the commission by Dr. Gustav Egloff, Universal Oil Products Co., Chicago.

Basis of Table 1 Estimates

The following paragraphs summarize briefly the methodology of the estimates given in Table 1.

Availability of paraffins was calculated on the basis of amounts present in natural gas, in gaseous products resulting from the thermal and catalytic cracking of gas oils, and from the thermal reforming of gasolines. Assuming that 65 per cent of natural gas will be used as fuel, the paraffins available in natural gas are calculated as only 35 per cent of the total natural-gas production. Availability of olefins was caluculated on the basis of amounts available from the gaseous products obtained in the thermal and catalytic cracking of gas oils and in cracking the corresponding paraffins obtained from refinery gases and natural gas.

From the total availability of propylene, the amount required for polymer gasoline was deducted. This (polymer) requirement was calculated on the basis of present capacity for producing 35,000 bbl. per day of nonselective polymer and on an assumption that 55 per cent of the polymer came from propylene and 45 per cent from butylenes.

From the availability of butylenes the amounts required for polymer gasoline and alkylate (for aviation fuel) were deducted.

The availability of aromatics was calculated on the basis of amounts available from United States petroleum and natural gasoline produced only by direct recovery and by Platforming.

Insufficient data were available for calculating the average amount of sulfur (H_2S) in the natural gases in the United States. It was assumed that they contained 1 per cent and that all H_2S could be recovered by the treatment of total gas production. The estimates of H_2S recoverable from thermal cracking assumed that the average charge to thermal cracking plants in the United States was 20° A.P.I. gravity with a sulfur content of 1.2 per cent. Thermal reforming was ignored. An A.P.I. gravity of 29° and a sulfur content of 1.5 per cent was assumed in calculating the sulfur available in the gases from catalytic cracking. Here, too, catalytic reforming was ignored.

TABLE 1—HYDROCARBON INTERMEDIATES AVAILABLE FOR CHEMICAL CONVERSION, 1950-75

(Million pounds)

	1950	1955	1960	1975
Paraffins:				
Methane	92,400	118,500	129,000	222,600
Ethane	24,950	26,820	28,300	38,450
Propane	23,700	27,150	30,400	40,650
Butane	21,224	26,100	30,900	45,500
Olefins:				
Ethylene	21,800	24,300	26,900	34,000
Propylene	25,400	28,600	32,100	42,500
n-Butylenes)				
Isobutylenes)	25,000	30,700	36,200	52,800
Aromatics:				
Benzene		9,350	11,760	18,950
Toluene		18,340	22,980	36,900
C_8 Hydrocarbons (o, m, and p-xylenes, and ethylbenzene)		23,470	28,520	42,260
Sulfur (from petroleum and natural gas)	1,440	1,748	2,026	2,850

Methane a Basis for Many Chemicals

Methane is the principal constituent of natural gas. Its chemical uses include the production of methanol, formaldehyde, methyl and methylene chlorides, carbon bisulfide, hydrogen (and subsequently ammonia), hydrogen cyanide, and synthesis gas (hydrogen and carbon monoxide). It will also be used extensively to produce acetylene.

Methanol is derived principally from synthesis gas, though a small amount is produced in other ways. Its chief uses are as antifreeze and as raw material for formaldehyde manufacture. Some formaldehyde is also produced by direct oxidation of methane and as a by-product of the Fischer-Tropsch synthesis of hydrocarbons.

Its chief use is in plastics production, which is growing rapidly. About 1.5 billion pounds of methanol and 1.8 billion of 37 per cent formaldehyde is indicated as the production for 1955 as compared with 902 million and 835 million pounds respectively in 1950.

Methyl chloride, methylene dichloride, and small quantities of chloroform and carbon tetrachloride are made by chlorination of pure methanol. The demand in 1951 for methyl chloride of about 42,591,000 lb. was some 5 million pounds above expected production. Its main uses other than for silicone and other synthetic rubbers is as a refrigerant. It is useful as a solvent for insecticide bombs. Methyl chloride production may increase to 55 million pounds by 1955 and possibly 100 million or more between 1965 and 1975.

Methylene dichloride is also in short supply. It is used in safety films, in synthesis, as a refrigerant and in metal cleaners. Production in 1950 was 39.7 million pounds, and this may increase by 1954 to 60 million pounds.

Hydrogen cyanide is now being produced from methane and ammonia, instead of entirely from sodamide and carbon as previously. In 1950 production from methane was 7 million pounds out of a total production of 56 million. By the end of 1951 it was 50 out of 93.5 million pounds and by the end

of 1952 it is expected to be 130 out of a total of 191.5 million pounds. New capacity is chiefly for meeting requirements for production of acrylonitrile, utilized in synthetic fibers. Great expansion of production is expected in this field.

Carbon bisulfide is now being produced to a minor extent from methane and sulfur though most of it still is made from carbon and sulfur. Largest user is viscose rayon; carbon tetrachloride ranks next and cellophane third. An important but lesser volume use is in rubber accelerators. Although rayon demand is not increasing rapidly, the other uses are. Carbon tetrachloride production was about 40 million pounds below estimated requirements of 260 million pounds in 1951. Its use in Freon-type propellants and refrigerants is increasing rapidly.

Ammonia is synthesized by reforming natural gas with steam to give hydrogen which is then reacted with nitrogen. At present more than 50 per cent of the capacity is based on natural gas, the remainder on coke. The demand for ammonia is growing rapidly, total production of synthetic ammonia in 1950 having been seven times that in 1939. Increasing amounts of ammonia will be needed not only for growing requirements for fertilizer, but also to keep up with the rapid growth of the chemical industry.

Acetylene, now being produced from methane, is in short supply, and the demand is increasing. In addition to its use in welding, it is a raw material for vinyl chloride and acetate and for neoprene rubber. About 300 million pounds were used in 1950 for chemicals. Entirely new uses are developing based on the Reppe syntheses.

Ethane is present both in cracked gases from petroleum refining and in natural gas (about 7 per cent). It is usually not separated but used with methane for direct oxidation reactions. The gas is used in a mixture of cracked gases for ethylene production. However, for chlorination to ethyl chloride (used chiefly in lead tetraethyl) it is separated from the cracked gases.

Propane is also present in natural gas (about 4 per cent) and in cracked gases from petroleum. It may be left in the natural gas along with the other gases in oxidation reactions. But it is separated alone or with butane to give liquefied petroleum gas (L.P.G.), which is primarily used for heating and domestic purposes though some is used for chemical conversion.

Propane from cracked gases is used largely for ethylene production. Small amounts of nitromethane, nitroethane, and 1 and 2-nitropropane are produced by nitration of propane and increasing production over the next few years is probable.

Propane is one of the most important raw materials for chemicals, and requirements will continue to rise for many years to come on the basis of known products and processes alone.

Normal and isobutane are present in natural and cracked gases from petroleum refining. The normal butane in natural gas (about 1.5 per cent) is ordinarily used for chemical conversion admixed with other natural gas constituents or separated as L.P.G. The butanes are isolated from other components, however, for dehydrogenation to the corresponding butylenes, which are mainly used for aviation gasoline and synthetic rubber manufacture.

Pentanes are obtained from natural gasoline. For chemicals production they are converted to amyl chlorides which are intermediates for amyl alcohols, amyl amines, and amyl naphthalenes. These have uses as solvents, dye intermediates, wetting agents, corrosion inhibitors, insecticides, plasticizers, heat transfer media, etc. Although not in large volume production, these derivatives have many specific applications, for which requirements will increase.

The higher paraffins, found in kerosine and paraffin wax fractions, have a number of uses in chemical manufacture. They are oxidized to alcohols, aldehydes, and ketones and the oxidized products are used as oil additives, wetting agents, plasticizers, etc. The paraffin wax is oxidized to higher acids. Chlorinated paraffin compounds from kerosine are intermediates for pressure lubricants and for alkylation of benzene to produce detergents.

Demands Outstrip Supply for Ethylene Products

The commercial production of ethylene is generally integrated with other refinery operations. Ethane and propane gases obtained from gasoline manufacturing, or from natural gas, are subjected to high temperature cracking. Another method cracks selected fractions of gas oil. Recovery is effected by low-temperature, high-pressure fractionation and low-temperature absorption.

Demand exceeds supply for a number of ethylene-based products and may continue to do so for a number of years to come. Expansion of many chemical processes now in use, an increased dependence on petrochemical materials and new product development will accelerate the rate of growth.

Total requirements estimated for ethylene based on its maximum use as a source of its products are (millions of pounds) 1950, 1,536; 1955, 3,550; 1960, 5,220; 1975, 10,400. If some of the ethylene is replaced by carbohydrate derived ethyl alcohol or by acetylene the estimate would be 1955, 2,550; 1960, 3,700; 1975, 7,000.

If quantities of ethylene beyond those available from expanded gasoline refinery operations are required, processes specifically designed for ethylene will become important. A number of such processes are known and include an autothermic process involving partial oxidation with air, a regenerative cracking process and some catalytic processes. One of the latter (Catarole) is now in use in England.

Ethylene's chief use is as a raw material for organic chemical manufacture. In 1950 the following products were produced utilizing the amounts of ethylene shown (millions of pounds): ethylene oxide, 483; ethyl alcohol, 495; ethylbenzene, 173; ethyl chloride, 137; ethylene dichloride, 90; ethylene dibromide, 30; polyethylene, 55; other chemicals, 73.

Ethylene oxide itself is a fumigant, but its chief use is as an intermediate. In 1950, the chief products obtained from it and the amounts of ethylene consumed in each (millions of pounds) were as follows: ethylene glycol, 338; glycol ethers, 54; ethanolamines, 27.5; acrylonitrile, 24.5; detergents, 19; others, 20.

Ethylene glycol has had a phenomenal growth which will probably continue for a long time. Its major use is in antifreeze, but it is also used in making polyglycols for detergents and explosives, as well as being one of the raw materials for the new fiber, Dracon. Also the glycol ethers and the ethanolamines made from it have a wide range of uses.

Acrylonitrile produced from ethylene via ethylene oxide increased tenfold in consumption from 1941 to 1945 as a result of the high demand for synthetic rubbers. The new development of acrylic fibers forecasts an almost unlimited future for this material. It is, however, also produced from acetylene, and the role of ethylene in future increased production will depend on the comparative economics of the two processes.

The acrylate esters can also be produced via ethylene and ethylene oxide. The major production comes from acetone. They are chiefly used for plastics and have many uses in wartime aviation.

Other Ethylene Compounds

Ethyl alcohol surpasses ethylene oxide as a consumer of ethylene. In 1950 about 57.5 per cent of the alcohol production was derived from ethylene. On the basis of 60 per cent production of ethyl alcohol from ethylene more

than 800 million pounds of ethylene will be required by 1955 and more than 2 billion by 1975 for ethyl alcohol production. In case of war, an additional 100 to 200 million pounds of ethylene would be needed for ethyl alcohol production.

Ethyl benzene, produced from ethylene and benzene, is used chiefly to produce styrene for GR-S synthetic rubber and for polystyrene plastics. Although rubber requirements are being met, there is a rapidly increasing market for polystyrene.

Ethyl chloride is a growing market for ethylene. Most of present production is made for ethylene and hydrochloric acid. It is used principally for tetraethyl lead manufacture. It has other minor uses. Production in 1950 was 350 million pounds. Increases will depend to a large extent on the course of the market for tetraethyl lead.

Ethylene dichloride made from ethylene and chlorine, is also used chiefly in connection with tetraethyl lead but has use as a solvent and as an intermediate for vinyl chloride production. Production in 1950 totaled 304 million pounds, requiring 90 million pounds of ethylene. Requirements will increase with tetraethyl lead and vinyl resin consumption. The latter have more than doubled in the last 5 years. With planned expansion, total production will be increased about 20 per cent to reach 500 million pounds per year. Increase in vinylchloride may, however, come partially from acetylene as a base rather than from ethylene.

Ethylene dibromide, of which 180 million pounds was made in 1950, requiring 30 million pounds of ethylene, is used chiefly with tetraethyl lead. It has some minor uses as a solvent and intermediate for dyes and as a possible fumigant.

Polyethylene, an unusually versatile plastic made from ethylene, reached a production of 55 million pounds in 1950. It has one of the very largest potential markets of any of the plastics. It is useful in insulation, in radio, television and electronic equipment, and in packaging films, cups, plates, and containers. It is replacing cosmetic containers of glass and resists corrosion by many reagents including hydrogen fluoride.

A production of at least 200 million pounds by 1955 could be utilized and, unless some far superior materials are developed in the meantime, the billion-pound mark could be reached before 1975.

Propylene Products

Propylene is extracted from petroleum cracking gases, a total of 882 million pounds having been produced in 1950. Its major use is for production of isopropyl alcohol, of which 1 billion pounds was produced in 1950. Much more could be produced from propane in natural gas.

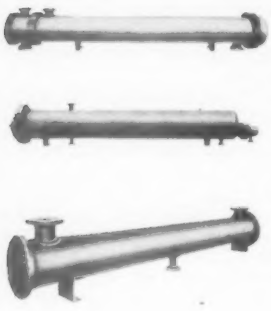
Isopropyl alcohol is in high demand. Its consumption has closely paralleled our industrial growth. Almost 75 per cent is used as a raw material for acetone production. It has many other and increasing uses such as in rubbing alcohol, lacquer solvent, antifreeze, cosmetics, vitamin crystallization, etc.

Glycerin is produced to some extent from propylene. Of a total glycerin production of 200 million pounds per year, 40 million pounds is produced from propylene, and this amount is being expanded to 60 million. Propylene glycol is also produced from propylene, to the extent of 90 million pounds per year.

Allyl chloride and allyl alcohol, important intermediates in certain types of plastics and coatings, are other products of propylene, and likewise, dichloropropane-dichloropropylene mixtures (D-D), useful as soil fumigants.

The tetrapropylene polymer is another derivative of propylene and is

AND SAW A PROBLEM



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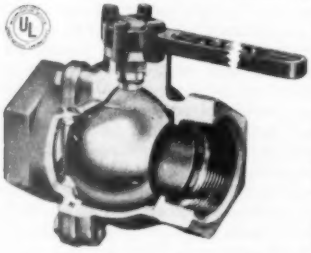

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used to alkylate benzene for production of detergents.

Cumene from propylene is also of high potential significance. Recently a process for producing phenol and acetone simultaneously has been developed with cumene as the starting material. It requires neither chlorine nor sulfuric acid, both of which are in short supply.

Butylene Forms

Butylenes are recovered from gases of petroleum cracking and also by catalytic dehydrogenation of the butanes. Principal uses are for synthetic rubber, alkylation and polymerization to aviation gasoline components, and for alcohols or other chemicals. Production of normal butylenes in 1950 was 904 million pounds, and of isobutylene, 124 million pounds.

Butadiene is the most important single product of the normal butylenes since it is used for making GR-S rubber, our major general purpose synthetic rubber. Some is also used in preparing the "N" type rubber (polybutadiene-acrylonitrile).

The secondary and tertiary butyl alcohols utilize the remainder of the normal and isobutylene production. They are used mainly as solvents for lacquers, paint removers, etc. Methyl ethyl ketone is perhaps the most important use of secondary butyl alcohol. Production was about 165 million pounds in 1951.

Higher Olefins

Higher olefins are present in the liquid fractions of cracked gasoline and oils. The heptenes are used as a starting material for the Oxo process for iso-octyl alcohol, which is of particular interest in production of diisooctyl phthalate, a plasticizer. Isooctyl alcohol will also find wide use in detergents, antifoaming agents, and organic syntheses. Application of the Oxo process to hexenes and nonenes will probably result in the commercial production of alcohols from these olefins.

Production of isooctyl alcohol is at the rate of 30 million pounds per year and two new plants will bring capacity to 50 million pounds.

Aromatic Chemicals

Benzene is produced from petroleum and natural gas by the catalytic reforming of six-carbon-atom naphthenes of gasolines.

Requirements for benzene have risen rapidly and exceed the amounts available from coal tar sources and imports. In 1951, 175 million gallons were produced from coke ovens compared to 25 million from petroleum. Imports during 1951 were 50 million gallons.

Obviously, great increases must come from petroleum and natural gas. Including plants now certified, rate of production from petroleum will reach 60 million gallons by mid-1952, 100 million by the end of 1952, and 130 million before 1954. It is expected that capacity based on petroleum will have to be increased by an additional 70 million gallons by 1955 and if imports are lost, by 120 million gallons.

Many times the amounts indicated are potentially available from present petroleum and natural-gas production. Based on 1951 production of 2.1 billion barrels of petroleum and 120 million barrels of natural gasoline, 1,010 million gallons of benzene could potentially be made available. Estimating 2.5 billion barrels of petroleum and 200 million of natural gasoline for 1955, 1,270 million gallons of benzene could be obtained.

Major Consumers of Benzene

Styrene is the greatest consumer of benzene. It utilized 82 million gallons in 1951. It is estimated that requirements for styrene for polystyrene plastics will more than double between 1951

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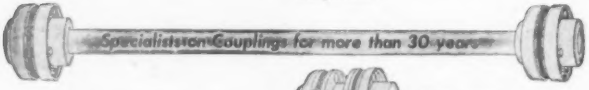

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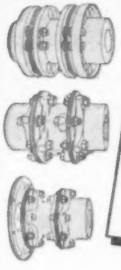

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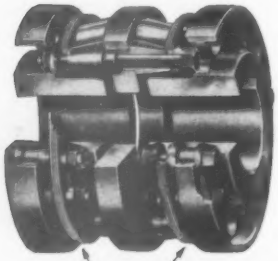

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and 1955, but the demand for styrene for synthetic rubber may lessen due to a reduction in the styrene content of the rubber.

Phenol is the second largest consumer of benzene. Production in 1950 was 312 million pounds against a consumption of 342 million. Ninety-five per cent of present production is synthetic (e.g., benzene derived). The remainder comes from coal tar. Estimated phenol requirements for 1955 are more than 550 million pounds.

Nylon is the third largest consumer of benzene. The present production of nylon is 100 million pounds per year. In 1951 consumption of benzene for its production amounted to 25 million gallons. A new plant to produce 50 million pounds per year is being built.

Aniline is the fourth largest market for benzene. In 1951 it consumed 16 million gallons.

Detergents, which are the fifth largest market for benzene, are expanding rapidly. Total surface-active agent production in 1950 reached 676 million pounds, of which 373 million pounds was cyclic. About 16 million gallons of benzene was required for production needs in 1951, 8 million gallons is estimated for 1955, and by 1975 perhaps 40 million gallons.

DDT (dichlorodiphenyltrichloroethane) and benzene hexachloride consumed 7 million gallons of benzene in 1950. It is estimated that for 1952, 8 million gallons of benzene will be required for DDT and 8.6 million gallons for benzene hexachloride.

Toluene Akin to Benzene

Toluene is produced from petroleum and natural gas by the same processes as benzene, but the starting material is the seven-carbon-atom naphthenic fraction of gasolines. Published 1950 production was 83.9 million gallons, more than 45 million of which came from petroleum. Any quantities of toluene needed are potentially available from petroleum.

Aromatics From Eight-Carbon Atoms

C_8 aromatics are produced by a catalytic reforming process similar to those for benzene and toluene. They include o, m and p-xylenes and ethylbenzene. The mixtures are used for aviation gasoline and components and solvents. Since 1946 o-xylene has been isolated for conversion to phthalic anhydride and p-xylene is being separated for use in the new fiber, Dacron.

Naphthalene, the most important of the polycyclics, was produced from coal tar to the extent of 300 million pounds in 1950. Present demand is 450 million pounds and is being met by importing the difference. Although phthalic anhydride is a large naphthalene consumer and is sure to grow, it may be more advantageous to produce it by the petroleum o-xylene route than by producing naphthalene from petroleum.

Cresylic acids are recovered from heavy cracked petroleum distillates by alkaline extraction. They are present in amounts up to 2 per cent. They consist of alkyl phenols, chiefly cresols and xylenols. More than two-thirds of 1950 production was from coal tar, and imports have supplied a large portion of United States demand in the past. Total production in 1950 was 67.7 million pounds, of which 16 million came from petroleum. Largest use is in phenolic-formaldehyde resins and tricresyl-phosphate plasticizers.

Carbon-Black Yield Better From Oil

In 1950, 1,382 million pounds of carbon black was produced in the United States, 93 per cent of which was used in rubber. Carbon-black requirements for 1975, as shown in Table 2, will nearly double 1950 production. Both natural gas and oil are used to produce the carbon black. Yields from

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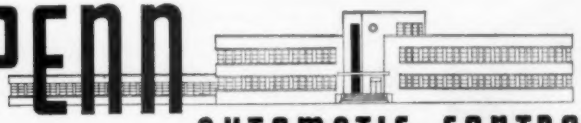

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TABLE 2—CARBON BLACK REQUIREMENTS AND ESTIMATED YIELDS FROM NATURAL GAS AND OIL

Year	Total carbon black requirements, million lb.	Natural gas: Consump., million cu. ft.	Natural gas: Carbon black, million lb.	Natural gas: Yield, lb. per 1,000 cu. ft.	Oil: Oil consumed, 1,000 gal.	Oil: Carbon black, million lb.	Oil: Yield, lb. per gal.
1955	2,000	498,000	1,300	2.61	233,000	700	3.00
1960	2,400	479,000	1,270	2.65	353,000	1,130	3.20
1975	3,575	269,000	715	2.75	842,000	2,860	3.40

TABLE 3—PETROCHEMICAL REQUIREMENTS FOR SURFACE-ACTIVE AGENTS
(Millions of pounds)

Year	Total surface active agents	Benzene	Propylene	Sulfur	Ethylene	Tetradecane
1955	800	132	317	82	14	33
1960	1,000	177	422	105	18	40
1975	1,600	304	726	179	22	68

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the gas are much lower than those from oil, and the use of oil is gaining ground.

The present yield from 1 gal. of oil is 2.85 lb., and by 1975 it may be expected to reach at least 3.4 lb. The furnace-black process utilizing oil will undoubtedly supersede processes using natural gas. Oil blacks are superior for many uses. The price is higher but will drop as the process is developed further.

In calculations leading to data in Table 2, it is assumed that by 1975, 80 per cent of United States carbon-black production will be from oil by the furnace process.

Sulfur Recovery From Gases

Sulfur is being produced from natural and refining gases at a rate of more than 200,000 tons per year. New capacity for recovery will add 100,000 tons per year to this total by the end of 1952. Economics will determine the additional sulfur recovery from these sources. Natural gasoline plants in the vicinity of Odessa, Tex., alone burn 500 tons of recoverable sulfur per day.

Important End Products

Detergents . . . Detergents in the past 5 years increased from about 6 per cent to 47 per cent of the total soap-detergent market. Production in 1950 was 1.66 million pounds. The active compounds in detergents, i.e., the surface-active agents, comprise 40 per cent of the total weight. Sulfated or sulfonated cyclic compounds, largely from petroleum, are by far the largest class. They are principally derived from benzene and long-chain aliphatic compounds and from selected aromatic gas-oil fractions. Some alkyl naphthalene sulfonates are also made. The nonsulfonated nitrogen containing compounds come from nonpetroleum sources except for their ethanolamine content. The polyhydric alcohol esters and ethers are based on animal and vegetable oils and on glycol made from petroleum.

The use of detergents is sure to increase greatly. They will replace a higher proportion of the soap market. Detergent production should be raised to 2 billion pounds by 1955, 2.5 billion pounds by 1960, and possibly 4 billion by 1975. These quantities would require 800 million pounds of surface active agents in 1955, 1 billion in 1960, and 1.6 billion in 1975. Present estimates are that petrochemicals comprise over half the total surface-active agents. This will be higher as more benzene is derived from petroleum. Taking benzene, propylene, sulfur, ethylene, and tetradecane as the major petrochemical source materials (though some others will undoubtedly come into the pic-

ture), we arrive at the estimate in Table 3.

Insecticides and weed killers . . . Chemicals used in insecticides and weed killers come in large part from petroleum and natural gas. Carriers for these chemicals also require large amounts of petroleum oil fractions. The most important consumers of petrochemicals are the two insecticides, DDT and benzene hexachloride, and the plant hormone weed killer 2,4-D (2,4-dichlorophenoxyacetic acid). Production of DDT in 1952 is expected to be 105 million pounds and of benzene hexachloride about 160 million pounds. Production of 2,4-D and derivatives was 28 million pounds in 1950.

The future demand for DDT may rise to 125, 150, and 200 million pounds in the years 1955, 1960, and 1975, respectively. The demand for benzene hexachloride for those years may be 170, 200, and 225 million pounds; for 2,4-D and derivatives, the figures may be 40, 50, and 80 million pounds, respectively. Chemical requirements for these products would then be 162, 194, and 251 million pounds of benzene and 25, 31, and 44 million pounds of ethylene in the years 1955, 1960, and 1975, respectively.

Plastics . . . Plastics are one of the largest consumers of petrochemicals. As coal tar reaches maximum production, petroleum and natural gas will be relied on for expansion. Plastics have grown from an initial production of less than 6 million pounds in 1922 to 2.28 billion pounds in 1950. Their chemical components are similar to those used for synthetic rubber and fibers. Plastics production in 1950 was as follows (millions of pounds): phthalic alkyds, 333; nonaromatic alkyds, 69; phenolics, 451; styrene, 356; rosin and rosin esters, 75; urea melamine, 219; vinyls, 381; cellulose acetate, 110; other cellulose, 20; miscellaneous, 267.

Some classes of plastics are growing rapidly and others are leveling off, but as a whole the industry can be expected to increase to many times its present size. A total production of 3.5 billion pounds in 1955, 4.8 billion in 1960, and 9 billion in 1975, is probable.

The alkyds are used mainly in paints, varnishes, and allied finishes, and are based chiefly on phthalic anhydride and glycerol. They are growing in volume but not spectacularly. A total of 530 million pounds may be produced in 1953, 670 million in 1960, and 1,330 million in 1975. This would require (in millions of pounds) 192, 240, and 480 of phthalic anhydride for each of these years, respectively, and 80, 100, and 200 of glycerol.

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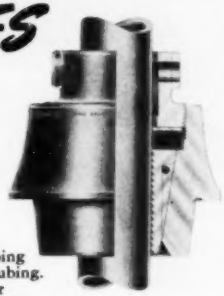

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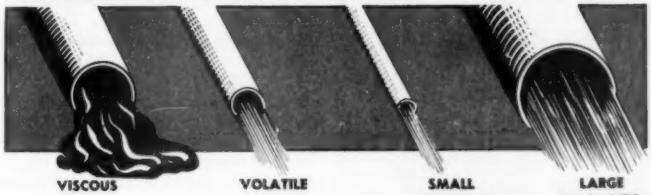

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UP IN THE BUSH COUNTRY of the Northwest Territories, a surveyor sets up an observation point for the plane-table man to survey-in for a geological reconnaissance.

ONE of the most unusual safaris in oil exploration is that conducted each winter into the bush country north of Calgary, Alta., near the boundary of Northwest Territories. A maze of bogs and swampland during the summer season, this territory is inaccessible to operations. Geophysical research is limited to winter when the soil is frozen solid.

The expedition, conducted by Rogers Exploration Service of Calgary, is comprised of a mobile city of five office trailers equipped with office furnishings, bathrooms, and beds. In addition, a utility trailer is used for storage purposes, a mess trailer serves food, a plant trailer generates 110-a.c. electric current, and bunk trailer affords sleeping accommodations for workers.

Roads bulldozed . . . Roads are bulldozed through timbers and underbrush for transporting trailers to locations for field operations. Utilities are set up, fuel is stored, and electricity generated from the mobile plant. The independent city is made possible by the trailers.

Gravity-meter surveys in winter are made over frozen ground in temperatures which often drop to −70° F. Points are selected on a ½-mile grid on all available roads, trails, or bulldozed lines which are surveyed and observed with a gravity meter.

John O. Rogers, president, who moved his exploration service to Canada in 1949, said that trailers are a 'must' up here during our operations." The firm recently towed from Texas to Canada its ninth trailer; these are manufactured by Travelite Trailer Co. of Texas., Fort Worth.

Well-insulated units . . . The trailers are conditioned for the rigorous winters at the factory by installation of storm windows comprised of double-partition glass to prevent freezing and frosting. Before the trailer city is completely set up, water mains must be buried to depths of at least 8 ft.

Selector Valves Aids Control Positioning

A CRITICAL operational task is the manual control of catalyst slide valves in a fluid catalytic cracking unit. This chore may be simplified by the installation of four-way selector valves on each slide valve; this enables the slide to be moved in either direction by simply moving the handle to "open" or "close" position.

Quick positioning . . . Through the use of selector valves, the slide valve may be quickly positioned as desired whenever the automatic controls become inoperative or during startups.

While bringing a unit on stream following a downtime period, the slide will frequently seize on the seat and it is necessary to operate the valve on manual control and attempt to move the slide back and forth until it breaks free and can once more be operated automatically. To move the slide forward, it was necessary to open a 1-in. gate valve and to close another. To move the slide in the opposite direction, it is necessary to repeat the operation on two different valves. To be effective, the movement of the slide must be rapid.

When it is considered that the slide valves are placed one on top of the other and that the 1-in. valves which controlled the movement of the valves were 8 ft. off the floor platform, it can easily be visualized that the movement of the slide under manual control would neither be rapid nor easily accomplished, especially with one operator attempting to move the slide valve.

Rapid valve travel . . . The importance of being able to move the valve rapidly cannot be overemphasized. During normal operations of the catalyst unit a hydraulic failure may occur causing the valve to travel to an extreme position, either open or closed. This results in a serious, operational upset which must be corrected immediately by returning the valve to the proper position. By installing four-way selector valves on each slide valve, the slide can be moved in either direction simply by moving the handle to "open" or "close" positions.

This method was suggested by Melvin B. Ocker, instrument repairman, Baytown, Tex., refinery, Humble Oil & Refining Co.

PLANE-TABLE instrument man and geologist Harvey (Pete) Beasley plots location of next hole to be "drilled" by pit-digger at Little Buffalo Basin, Wyoming (above left). Right, truck-mounted rotary rig with collapsible mast looks like a pole-lifter but cuts a 32-in. diameter hole to expose outcrops to the field geologist.

Truck-Mounted "Pit-Digger" Aids Surface Geologists

STRIKE-AND-DIP structural information hidden by alluvial top soil is revealed to the surface geologist by the use of a large "pit-digger" designed and operated by Ohio Oil Co. personnel.

To a casual observer watching the device move along a highway, it would appear to be a water-well digger or a pole-lifter.

Rotary driven . . . The pit-digger is a truck-mounted job equipped with a rotary table and draw works driven through a 20-ft. square kelly by the truck engine. The rig is equipped with a 50-ft. mast which is pin-anchored to the base-legs when lifted for operation.

Small-diameter drill-stem is run through the square kelly and turns a 32-in. diameter steel cylindrical bucket which serves to hold the "bite" recovered. Cutting action is done by means of a large spiral-shaped auger mounted in and protruding beneath the bucket.

In operation, the bucket takes a bit of earth, drill-and-bucket is hauled to the surface of the ground, moved to one side of the rig, the "bite" dumped, and the drill-and-bucket lowered into the hole for another cut. Once the desired depth is reached, bucket and drill-stem are removed and laid down.

Into man-hole . . . A looped rope is rigged up by means of which the geologist is lowered into the hole opposite the exposed outcrop of the formation to be studied. He measures the amount of dip and direction of strike and records the data on a plane-table board. After he is lifted out of the hole, drillers cover up the "man-hole" and the rig is moved to next location.

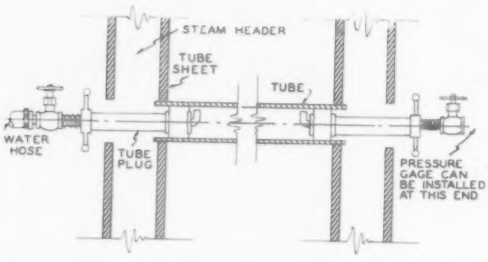
Position plotted . . . A surface geological party includes an instrument man who operates the plane table and a rodman who places a 15-ft. wooden rod at the outcrop of the bed to be mapped. Where the marker ledge is covered by alluvial soil, the instrument man plots on the plane-table the position of the hole to be drilled by the pit-digger.

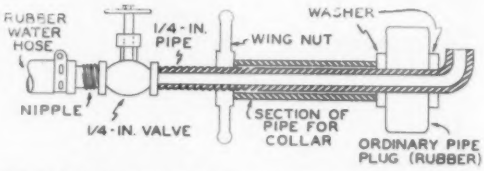
Dip-and-strike data from the now-exposed outcrop made possible by the pit-digger is drawn on the plane-table as if it were a surface outcrop. The instrument man then decides the location of the next hole to be drilled by the pit-digger. A number of man-holes are dug until sufficient dip-and-strike data are plotted on the map to reveal the outlines of the surface structure.

Proved in Rockies . . . The pit-digger was designed back in 1932 by the late "Uncle Jack" McFadyen, one-time vice president and director of Ohio. It was built at Grass Creek, Wyo., by Jack Francis, a machinist. It has proved its value in the East Allen Lake structure in the Medicine Bow district of Wyoming and was used widely throughout the Rockies and in California.

In recent months, it has been used at Little Buffalo Basin, Wyo., where it cuts three or more holes daily from 15 to 50 ft. in depth. (This article courtesy The Beacon, Ohio Oil Co.)

BUCKET IN ACTION is dumped from the rig by Head Well Puller Marvin Hitz of Byron, Wyo. (above left). Right, cutaway outcrop is exposed by well digger so Geologist Ray Beitman of Powell, Wyo., can read dip-and-strike to round out structure information.





STEAM-BOILER views (left) in cross-section showing arrangement for testing steam boiler tubes. Water under pressure enters tube plug at left and outlet pressure is read on pressure gage installed at extreme right. TUBE PLUG detail, above.

Finding Faulty Boiler Tubes

Shop-fabricated tester, using water pressure, picks out troublesome tube

POSITIVE hydrostatic testing of boiler tubes may be made by use of a device easily fabricated in any machine shop.

Isolate faulty tube . . . Isolation of individual, faulty tubes is helpful. Methods employed previously required the testing of an entire bank of tubes; moreover, the leak required visual inspection. Frequently, it would be necessary to remove an entire cluster of tubes before the leak could be accurately determined.

The new method employs the principle of blocking-off one end of the tube with a unit equipped with a pressure gage; water is injected at the other end under pressure. When a pressure is indicated on the gage which approximates that of the water pressure, the tube tests sound. Otherwise, fall off in pressure indicates that the tube under test contains a leaky section.

The testing device consists of two units, one of which is inserted at the inlet side of the tube under test. This comprises a nipple which connects a ¼-in. gate valve to a rubber hose for water entry; a ¼-in. pipe connected to the other side of the gate valve with an elbow at the end; a simple rubber plug used with pipes mounted over the ¼-in. pipe immediately ahead of the elbow. A section of pipe, held in place with a large wing nut, serves as a collar to squeeze the plug so that it seals off the tube.

The inlet unit is duplicated in part by the unit used at the outlet end of the tube. The gate valve, rubber plug, collar and wing nut are joined as before, but a pressure gage is mounted on the extreme side of the gate valve. Water is passed through the inlet unit into the tube and pressure recorded at the gate at the outlet side.

Thomas H. Lacy, boilermaker department, Esso Standard Oil Co. refinery, Baton Rouge, La., suggested this method.

Elevated Line Prevents Clogging

THE shifting of a line from an underground to an overhead position can save maintenance time if the line clogs up often.

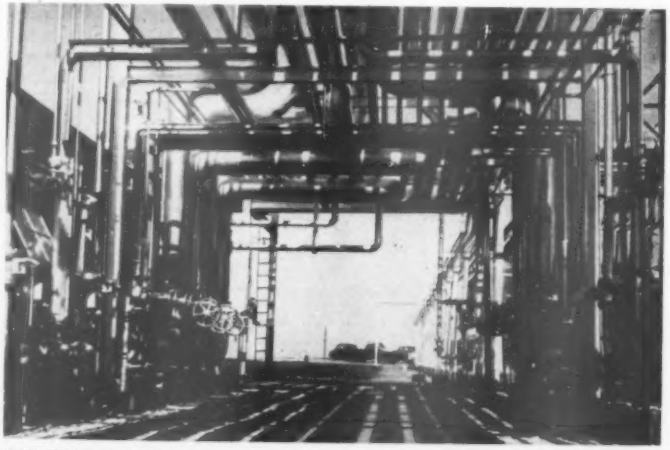
A case example was found in a line which carried water from a pipe-still seal drum to a barometric water separator. The line extended a short distance from the seal drum and then went underground until it reached the separator at which point it emerged at the charge inlet.

Under the old arrangement, water and any light oil from the barometric seal drum remained continuously in the underground section of the pipe; the accumulated sludge would plug the line often.

Elevation of a segment of the pipe to an aboveground position above the separator not only eliminated much of the residual sludge but made it more accessible for cleaning.

DASHED LINE shows elevated position of line leading to inlet charge point of a barometric water separator which eliminates formation of residual sludge.

William J. Irby, helper at the Baytown, Tex., refinery of Humble Oil & Refining Co., suggested this method.



OVERHEAD PIPING arrangement at the Elk City gas processing plant permits an operator to handle rich oil control valves at left and to adjust valves in oil heater circuits at right by moving only a few steps away. This is part of Shell's simplified layout which provides for efficient operation.

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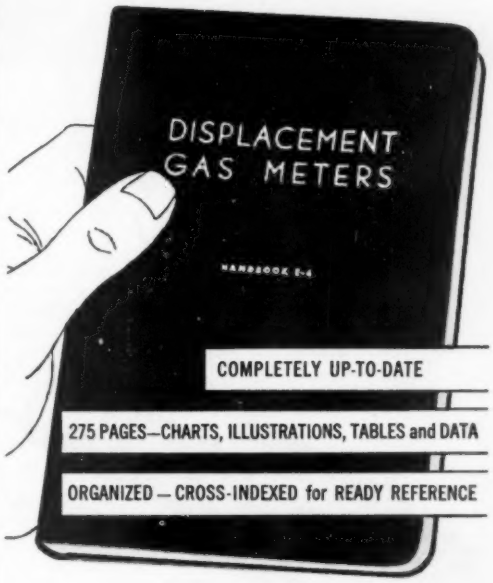

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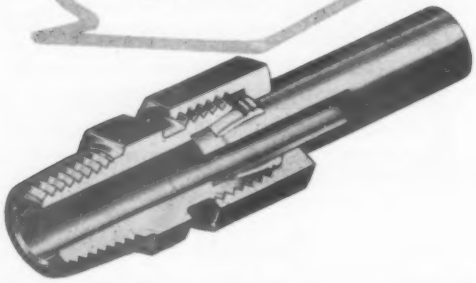

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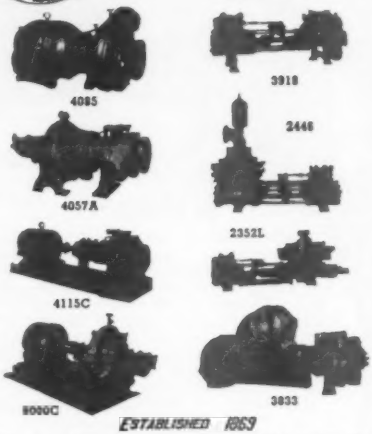

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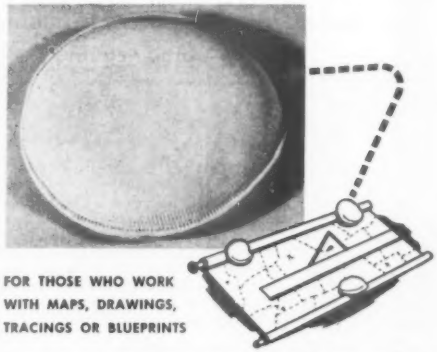

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THE JOURNAL'S WEEKLY
Engineering Reference
SECTION
No. 21

FANS AND BLOWERS:

Part 2—Types and Comparisons

by M. Van Winkle*

THERE are two principal fan or blower types based upon the method by which the physical movement of the air or gas is effected.

Radial, or centrifugal . . . This type creates gas movement by forcing the gas radially from the axis of rotation by centrifugal force. This creates a reduced pressure area at the axis of rotation causing more gas to flow into the fan. Thus the gas flows in to the center of rotation from the side and leaves from the end of the blades at right angles to the direction at which it entered. Some of the fan-blade arrangements for the radial-type fan are straight blade, forward curve blade, backward curve blade, and radial tip blade, as shown in Fig. 1.

*Professor of chemical engineering, University of Texas.

Axial-flow fan . . . This produces gas movement by screw action of blades moving the gas along the axis of rotation. The gas is pulled in by the vacuum created by the leading edge of the fan blade and discharged from the trailing edge in a helical motion. The common axial-flow fan uses propeller blades ranging from 2 to 16 or more in number. The **tube-axial-flow** fan is of the same type as the propeller except that it is mounted concentrically in a tube or duct through which the air or gas flows. The **vane-axial-flow** fan also utilizes propellers to impart movement to the gas. It is mounted in a tube or duct with vanes mounted before or after the fan blades parallel to the line of flow. This mounting disrupts the helical screw-type motion of the gas as it passes through the duct.

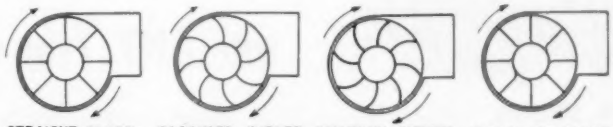

Fig. 1—Fan-blade arrangements for radial-type fans.

TABLE 1—COMPARISON OF FANS AND BLOWERS

	Radial or centrifugal	Propeller	Tube axial	Vane axial
Volume capacity	Wide range	Wide range	Wide range	Wide range
Pressure (static) in. of H_2O	1-25 (special to 60 in. H_2O)	0-1	0.25-2.5	0.5-6 (special to 60 in. H_2O)
Material	Sheet or cast metal	Sheet or cast metal, plastic or rubber	Sheet or cast metal, plastic or rubber	Sheet or cast metal
Drive	Belt or direct	Belt or direct	Belt or direct	Belt or direct
Inlet	Single or double	Single	Single	Single
Service	Ventilation Forced draft Induced draft Abrasive materials Pulverized fuels Wool-cotton fibers High-temp.	Ventilation Fume exhaust Cooling tower draft	Ventilation Hot, corrosive flammable, explosive mixtures	Ventilation Med. temp. Gas or air exhaust Fume exhaust

Comparisons . . . Table 1 lists a comparison of the general fan and blower types with regard to capacity range, static pressure, material, type of drive, inlet, and application. The factors listed in Table 1 form a basis for the initial selection of the principal fan or blower type. In addition to these factors, the following must be considered before a final selection is made: fan static pressure, fan mechanical efficiency, fan static efficiency, horsepower requirement, and in some cases, relative intensity of sound level. These characteristics vary from fan to fan and also vary throughout the operating range of any given fan. Therefore, it is necessary for intelligent selection of a fan or blower to have available the various characteristic curves of the fans under consideration. These are available in the manufacturers' literature.

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Critical Flow of Gas in Pipe (Continued)

by Ralph F. Nielsen*

IN the previous installment on this subject it was pointed out (subject to a number of assumptions) that at critical flow:

$$p_1/p_2 = [1 + (0.35\,k\,l/d^{4/3})]^{1/2} \quad (1)$$

where p_1 and p_2 are pressures in psia. near the upstream and downstream ends of a length l feet of uniform pipe, k the specific heat ratio, and d the diameter in inches. If p_1/p_2 is greater than this value, p_2 being the pressure in the reservoir into which the pipe discharges, the flow is critical and the rate, in standard cubic feet per day, is given by:

$$Q_c = 6.6 \times 10^5\, p_2\, d^2\, (k/GT)^{1/2} \quad (2)$$

where G is the gravity of the gas compared to air and T the temperature in degrees R.

Values of p_1/p_2 and of Q_c/p_1 are shown in Fig. 1 as a function of l for the nominal pipe sizes indicated, taking G = 0.6, k = 1.1, T = 520. For instance, consider a length of 4-in. pipe in which the pressure is 100 psia. at a point 200 ft. from the downstream end, which is discharging to the atmosphere. From Fig. 1 $p_1/p_2 = 3.5$. This is less than 100/14.7, so the flow is critical, $p_2 = 28.6$, and, using the full lines, the flow is 20 million standard cubic feet per day.

If a section of pipe is fed from a reservoir at p_1 there is a pressure drop between the reservoir and a point in the pipe close to the reservoir (at p_2), the relation given previously being:

$$\ln (p_1/p_2) = \frac{k}{2\,[1 + (0.35\,k\,l/d^{4/3})]} \quad (3)$$

Values of p_1/p_2 are shown in Fig. 2 as a function of l and d for k = 1.1. If, for instance, a reservoir at 100 psia. is feeding into a 50-ft. length of 3-in. pipe which in turn is feeding the atmosphere, $p_1/p_2 = 1.12$ from Fig. 2, whence $p_1 = 89$. From Fig. 1 $p_1/p_2 = 2.3$, which is smaller than 89/14.7, so the flow is critical and $Q_c = 89 \times 180{,}000 = 16$ million.

It is to be noted from Equation 2 that p_1/p_2 approaches a value of about 1.7 (for k = 1.1) as l approaches zero. This corresponds to critical flow through an orifice or nozzle. The above equation was, however, derived from certain assumptions and the value of 1.7 is not entirely correct.

If the value of p_1/p_2 as obtained from the curves had been greater than p_1/p_2 the flow would not have been critical. For instance, had the pipe been ½-in., with the other conditions the same, p_1/p_2 would be 12, which is greater than 100/14.7. In that case the flow would be given by one of the usual pipe-line formulas and not by Fig. 1.

*Associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

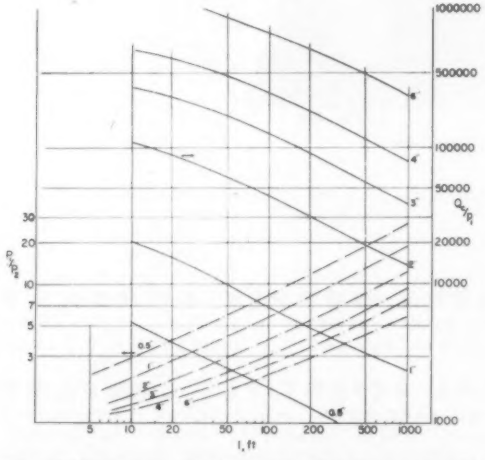

Fig. 1—Values of p_1/p_2 and Q_c/p_1 under critical flow as a function of pipe length for the nominal standard pipe diameters indicated.

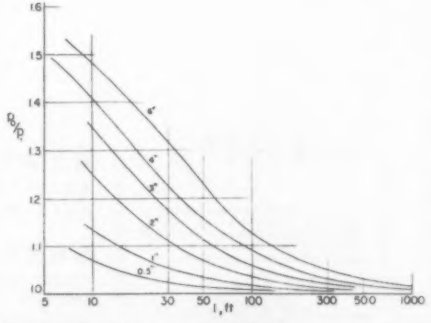

Fig. 2—Values of p_1/p_2 under critical flow as a function of pipe length for the nominal standard pipe diameters indicated.

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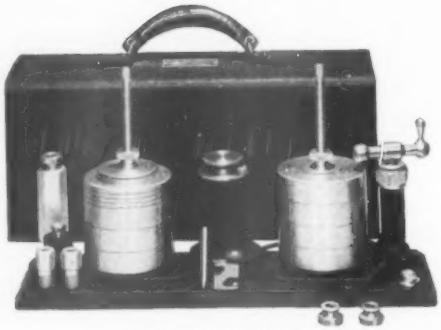

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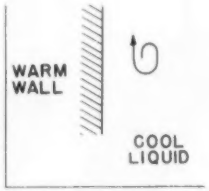
Liquid Movement: Natural Convection

Height of Wall: Short (Less than 0.15 ft.)



EQUATION:

$$h_f = 0.55 \frac{k}{L}\left[\frac{L^3 \rho^2 \beta g \Delta t}{\mu^2} \cdot \frac{c\mu}{k}\right]^{\frac{1}{4}}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.

k - Thermal conductivity of liquid at t_f, BTU/hr. ft. °F.

L - Height of vertical wall, ft.

ρ - Density of the gas at t_f, lb./cu. ft.

g - Acceleration of gravity. 4.17×10^8 ft./hr.^{2}

β - Coefficient of volumetric expansion of liquid at t_f.

Δt - Temperature difference between wall and liquid °F.

μ - Viscosity of liquid at t_f, lb./ft. hr.

C - Specific heat of liquid at constant pressure, BTU/lb. °F.

t_f - Film temperature, assumed as arithmetic average of wall temperature and bulk liquid temperature, °F.

LIMITATIONS: Equation applicable for values of the function

$$\left[\frac{L^3 \rho^2 \beta g \Delta t}{\mu^2} \cdot \frac{c\mu}{k}\right]$$ between 10^3 and 10^9.

Above 10^9 use equation A 5 a (2). Wall lengths greater than 0.15 ft. will usually give values of the function greater than 1×10^9.

SOURCES OF DATA:

For physical constants for use in above equation see Chemical Engineers' Handbook - J. H. Perry (1948).

for ρ -- see pp. 130-148, 175-195, 1583.
μ -- see pp. 370-374, 1198, 1696.
β -- see p. 200-202, 1675.
k -- see pp. 459-461, 1303, 1697.
C -- see pp. 225-235, 297, 1588, 1696.

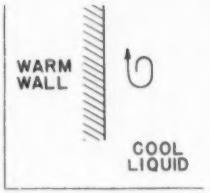
REFERENCES:

1. Introduction to Heat Transfer, Brown and Marco, pp. 113-115.

COEFFICIENT of HEAT TRANSFER through FILM between SURFACE of WARM VERTICAL WALL and COOL LIQUID

Liquid Movement: Natural Convection

Height of Wall: Normal to long (over 0.15 ft.)



EQUATION:

$$h_f = 0.13 \frac{k}{L}\left[\frac{L^3 \rho^2 \beta g \Delta t}{\mu^2} \cdot \frac{c\mu}{k}\right]^{\frac{1}{3}}$$

or simplified

$$h_f = 0.13\, k \left[\frac{\rho^2 \beta C g \Delta t}{\mu k}\right]^{\frac{1}{3}}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr.sq.ft.°F.

k - Thermal conductivity of liquid at t_f, BTU/hr.ft.°F.

L - Height of vertical wall, ft.

ρ - Density of the liquid at t_f, lb./cu. ft.

g - Acceleration of gravity. 4.17×10^8 ft./hr.^{2}

β - Coefficient of volumetric expansion of liquid at t_f.

Δt - Temperature difference between wall and liquid, °F.

μ - Viscosity of liquid at t_f, lb./ft. hr.

C - Specific heat of liquid at constant pressure, BTU/lb. °F.

t_f - Film temperature, assumed as arithmetic average of wall temperature, and bulk liquid temperature, °F.

LIMITATIONS: Equation applicable only for values of the function

$$\left[\frac{L^3 \rho^2 \beta g \Delta t}{\mu^2} \cdot \frac{c\mu}{k}\right]$$ greater than 10^9.

For most liquids and wall heights greater than 0.15 ft. this value will be exceeded.

SOURCES OF DATA: For physical constants for use in above equation see Chemical Engineers' Handbook - J. H. Perry, (1948).

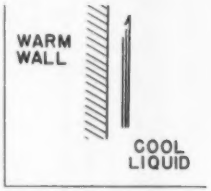
for ρ -- see pp. 130-148, 175-195, 1583.
μ -- see pp. 370-374, 1198, 1696.
β -- see p. 200-202, 1675.
k -- see pp. 459-461, 1303, 1697.
C -- see pp. 225-235, 297, 1588, 1696.

REFERENCES:

1. Introduction to Heat Transfer, Brown and Marco, pp. 113-115.
2. Applied Heat Transmission, Herman J. Stoever, p. 80.
3. Studies in Heat Transmission, Colburn and Hougen, Industrial and Engineering Chemistry, 22, 522, (1930).

COEFFICIENT of HEAT TRANSFER through FILM between SURFACE of WARM VERTICAL WALL and COOL LIQUID

Liquid Movement: Streamline (laminar) flow.



EQUATION:

$$h_f = 0.662 \frac{k}{L}\left[\frac{c\mu}{k}\right]^{\frac{1}{3}}\left[\frac{LV\rho}{\mu}\right]^{\frac{1}{2}}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr.sq.ft.°F.

k - Thermal conductivity of liquid at t_f, BTU/hr.ft.°F.

L - Height of vertical wall, ft.

ρ - Density of the liquid at t_f, lb./cu. ft.

μ - Viscosity of liquid at t_f, lb./ft. hr.

C - Specific heat of liquid at constant pressure, BTU/lb. °F.

V - Velocity of flow, ft./hr.

t_f - Film temperature, assumed as arithmetic average of wall temperature and bulk gas temperature, °F.

LIMITATIONS:

Caution must be used in application of the equation in that laminar flow is difficult to secure except in liquids of high viscosity.

SOURCES OF DATA:

For physical constants for use in above equation see Chemical Engineers' Handbook - J. H. Perry (1948).

for ρ -- see pp. 130-148, 175-195, 1583.
μ -- see pp. 370-374, 1198, 1696.
k -- see pp. 459-461, 1303, 1697.
C -- see pp. 225-235, 297, 1588, 1696.

REFERENCES:

1. Introduction to the Transfer of Heat and Mass, Eckert, pp. 89-93.

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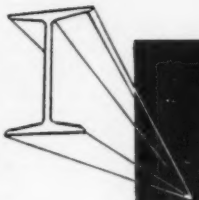

PROGRESS IN METALS

by W. L. Nelson
Technical Editor

Wear-Resistant Materials and Alloys

TABLE 1 is an attempt to organize the hard-facing materials that are available with respect to their physical properties and the services that they perform. A classification based on chemical composition is of little value except as a pattern by which the alloys can be remembered. Differences in heat treatment or small differences in composition can cause great differences in performance. Accordingly, no attempt at a chemical classification was made. The outstanding features of some of the groups of materials of Table 1 are:

Abrasion resistance — diamonds and tungsten carbides (B and C).

High-temperature strength, corrosion and abrasion resistance—cobalt-base alloys (F).

Impact resistance and work hardening — austenitic manganese steel (K).

High creep strength—Nickel base (G).

Cheapness — pearlitic low-alloy steels or martensitic alloys (I, E, and H).

Black diamonds are not widely used now except in grinding and for core-drilling bits. Tungsten carbide in the crushed form may be applied by dusting the hot surface followed by additional fusion of the surface, or in the form of hollow welding rods that are packed with carbide. The fused carbides in the form of cast inserts or slugs are simply welded into the surface.

The high chromium irons which contain carbon, possess hardness because of crystals of the trigonal carbide Cr_7C_3. Cast rods or electrodes are the usual form. The chromium content usually exceeds 25 per cent and the manganese and silicon contents are often 6 and 2 per cent respectively.

Martensitic cast irons are white or chilled irons containing about 2 per cent carbon and such carbide-producing elements as chromium (1.5), nickel (4.5); chromium (4), molybdenum (4); chromium (8), tungsten (15).

The cobalt-base alloys usually contain more than 40 per cent cobalt (sometimes 58 per cent), 25-35 per cent chromium and 4-15 per cent tungsten, as well as 1-3 per cent carbon. Such alloys retain much of their hardness at 1,200° F.

The nickel-base alloys exhibit good corrosion resistance and high creep strengths. They contain 50-70 per cent nickel, 13-18 per cent chromium, and smaller amounts of boron, molybdenum, or tungsten.

The pearlitic low-alloy steels and the low or medium-alloy martensitic steels are so well known that they need not be discussed. All of the common alloy elements have been used but the primary ones are the carbide-producing alloy elements such as chromium and molybdenum.

The stainless steels (over 12 per cent chromium) and the modified high-chrome-nickel steels are examples of the austenitic work-hardening steels of group "J," but the typical example of such a group is austenitic or Hadfield's manganese steel (11-14 per cent manganese). The latter is extremely tough and shock resistant, and its surface becomes work hardened during abrasive action imparting a fair or good resistance to abrasion.

TABLE 1—COMPARISON OF WEAR-RESISTANT MATERIALS OR ALLOYS

Materials group—		General properties	Approximate effectiveness—1 means maximum property and 11 means poorest: Abrasion resistance	Impact resistance (lack of brittleness)*	Corrosion resistance	Cold hardness
A Black diamonds	Increasing abrasion resistance; but properties are sensitive to carbon content and microstructure	Maximum hardness Maximum abrasive resistance	1	11	1	1
*Tungsten carbide:						
B Crushed		Excellent abrasion resistance Worn surfaces become rough	2	9	8	3
C Fused inserts			3	10	7	2
D High chromium irons		Excellent erosion resistance Oxidation resistance	4	8	5	4
E Martensitic irons		Excellent abrasion resistance High compressive strength	5	7	9	5
F Cobalt base nonferrous		Oxidation and corrosion resistance High hot and creep strength	6	5	2	8
G Nickel base alloys		Corrosion resistance Some oxidation resistance and a high creep strength	7	4	3	10
H Martensitic steels		Good combination of abrasion and impact resistance Good compressive strength	8	6	10	6
I Pearlitic steels	Increasing toughness	Inexpensive—fair abrasion and impact resistance	11	3	11	11
Austenitic steels:						
J Stainless		Good work hardening Corrosion resistant	10	2	4	†9
K Manganese		Maximum work hardening and toughness Fair abrasion resistance	9	1	6	†7

*Applies to whole composite including mounting. †Work-hardened surface.

Photo courtesy of Oregon Game Commission

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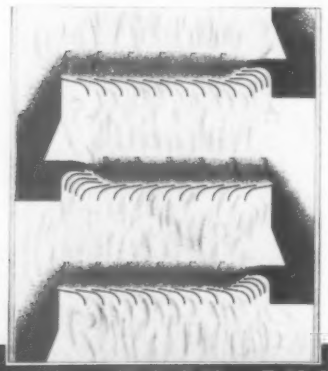

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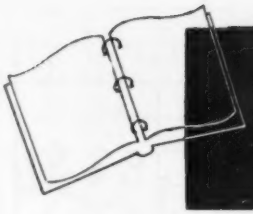

REFINER'S NOTEBOOK

Analysis of Sodium Naphthenate Solutions

by M. R. Beychok*

THE chief source of commercial naphthenic acids is spent caustics from the scrubbing of straightrun distillate-oil fractions. A recent article[1] presented an economic study of the desirability of recovering, segregating, and selling those caustics containing sodium naphthenate, and a test procedure for determining total crude naphthenic acid content of the spent caustics.

However, the refiner sells his sodium naphthenate solutions on the basis of their pure, water-free, neutral oil-free content of naphthenic acids. Therefore, the purpose of this paper is to present a laboratory procedure outline for determining the content of pure naphthenic acid.

The method is divided into two parts: first, the determination of the dry naphthenic acid content, and second, the determination of the neutral oil content of the naphthenic acids. Two variations of the first part will be presented.

Rather than present a rigorous, inflexible procedure, the method will be presented in an outline form which may then be modified to meet individual needs. For those who desire, the author will gladly furnish a detailed, step-by-step procedure.

Determination of Dry Naphthenic Acid Content (I)

1. A measured amount of spent caustic is pipetted into a modified Babcock-type sulfonation bottle and recorded as C, ml. The sample is neutralized with strong acid to the methyl orange end point and the bottle is then filled with water to the upper mark. The bottle is then centrifuged until the separation of the naphthenic acid is complete. The volume of naphthenic acid is read and recorded as NA, ml.

2. In order to obtain sufficient acid to determine a specific gravity, the above step is repeated on a larger scale in oil centrifuge tubes. The acid is removed from the tubes by decantation and filtered to remove the last traces of water. The specific gravity is determined and recorded as NAD.

3. The specific gravity of the original spent caustic is determined and recorded as CD.

Weight per cent of dry naphthenic acid
$= (NA)(NAD)/(C)(CD) \times 100$

Determination of Dry Naphthenic Acid Content (II)

1. A sample of spent caustic is pipetted into a small separatory funnel and the amount is determined by weighing. The weight is recorded as C, g. The sample is then neutralized with strong acid to the methyl orange end point. Sufficient volatile solvent (i.e., n-pentane) is added to dissolve and dilute the sprung naphthenic acids so as to facilitate a clear separation of layers.

2. The aqueous layer is drawn off. The acid layer is water washed with warm water and the water layer drawn off and discarded. The acid layer is further diluted with solvent and then filtered through an absorbent filter paper to remove the last traces of water.

3. The filtered acids are heated on a steam bath to remove the solvent, and then heated in an oven at 200° F. for 1 hour. The acids are then cooled and weighed. The weight of acid is recorded as NA, g.

Weight per cent of dry naphthenic acid
$= (NA)/(C) \times 100$

Neutral Oil Content of Naphthenic Acid

1. In order to obtain approximately 100 ml. of dry naphthenic acid, a large amount of spent caustic is neutralized in centrifuge tubes. After centrifuging, the acids are decanted and filtered.

2. Approximately 0.5 g. of the acid is removed and an A.S.T.M. acid number[2] is determined. Record as AN_1.

3. Using 50° Baume NaOH, saponify the acids back to the sodium naphthenate form. Transfer to a separatory funnel and add a light solvent (i.e., n-heptane) to extract the neutral oils. If a stable emulsion occurs, add more NaOH, **not** solvent or water.

4. After settling, draw off the clear portion of the lower layer. Discard the upper layer and the emulsified interface.

5. Repeat the solvent wash a second time.

6. Using the oil-free sodium naphthenate, obtain the naphthenic acid by neutralization, centrifuging, decantation, and filtration. The final yield is dry, neutral-oil free acid. Determine an A.S.T.M. acid number and record as AN_2.

Weight per cent of neutral oils in the naphthenic acid

$$= \frac{AN_2 - AN_1}{AN_2} \times 100$$

In order to calculate the content of dry, oil-free naphthenic acid in the original spent caustic, the neutral-oil content is subtracted from the dry-acid content as determined by either of the two methods outlined above:

Weight per cent of pure naphthenic acid
= per cent dry acid — [(per cent dry acid) (per cent neutral oils in dry acid)]

or = per cent dry acid (AN_1/AN_2)

References

1. "Naphthenates From Spent Caustic," M. R. Beychok, Petroleum Processing, May 1952.
2. A.S.T.M. Method D 974-51T.

*Chief chemist, Rothschild Oil Co., Santa Fe Springs, Calif.

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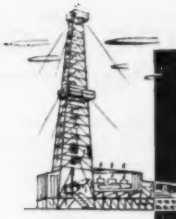


How to Maintain Oil-Field Chains—4

by Dave Breith*

Speed transmission . . . The drives within the selective-speed transmission should get occasional regular checkups to replace missing cotters, to repair any section noted to have a bad-looking place, such as cracked rollers, cracked or broken inner or outer side plates.

Here an ounce of prevention is worth more than several pounds of cure, for a quick repair can be made if a bad spot is noted upon inspection; but if it is allowed to run until it breaks, much additional shutdown time is required not only in replacing or repairing the broken chain, but the replacement and repairs to oil lines, shifting mechanisms, air lines, etc.

The cost of the parts is a lot less than the cost of shutdown time. A good time to check these drives could well be at the time casing is set; this could be done at each cement-waiting time, as well as before the rig is placed in operation when making a location move.

The master input drive chain should be examined every time the rig is moved as well as at cement time, and condition of the sprockets and the chain noted carefully. Worn sprockets will eat up chain faster than any other cause, other than misalignment.

The engine-compound chains should be examined as often as those in the draw works. The loads and shocks from drilling and hoisting through the draw works, as well as those transmitted back from the slush pump, are traveling into and through these chains.

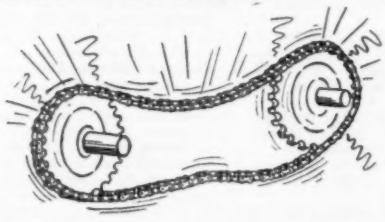
Pump . . . Every time the slush pump is being worked on, for any reason, such as checking valves and seats, changing liners or pistons, or whatever the job, then is the time to look over the chain on the pump drive. Repair if necessary. The pulsations of the rotary hose are greater at the pump, and are transmitted up through the V-belts to the drive pulley and into the chain drive. These and the pulsations from the engines are going through this drive, back and forth, often meeting in their travels with a terrific snap on the chain.

These conditions are all too often overlooked in the hurry of operations, and during the many things required during each drilling day and night. Drilling costs are higher, due to much higher wages, higher cost of general rig supplies, higher tax rates and interest rates, and higher cost of all repair parts for equipment.

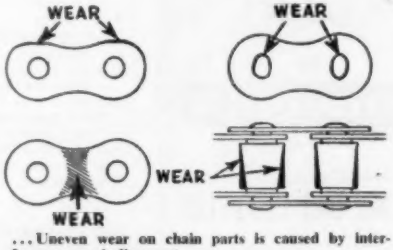
Drilling footage prices are not much changed during the same periods that these changes have taken place. Therefore, every precaution for the smooth, continuous operation of equipment is a must.

*Chain Belt Co., Milwaukee.

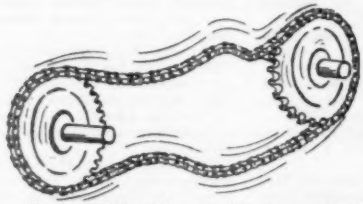
Prevent Chain Failure...



. . . Noisy operation caused by too much chain slack, OR improper lubrication, OR interference.



. . . Uneven wear on chain parts is caused by interference or misalignment.



. . . Excessive chain whip, caused by too much chain slack. Chain may also jump off sprocket when too slack.

. . . Wear on surfaces of sprocket teeth is due to improper lubrication. Shaft bearing wear is due to tight chain.

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• **California-Oregon Pipe Line System**—103 miles, 6-in., proposed, Crescent City, Calif., to Medford, Oregon.

• **Cities Service Pipe Line Co.**—64 miles, 18-in., planned, South Lake, Tex., to Lake Charles, La. Completion date 1-1-53.

Continental Pipe Line Co.—105 miles, 8-in., contracted, Rincon to northwest of Sullivan City on to Port Isabel, Tex. Western Const. Co. Completion date 9-30-52.

• **Continental Pipe Line Co.**—217 miles, 12-in., planned, Wichita Falls, Tex., to Ponca City, Okla. Completion date 1952.

• **Cooperative Refinery Association.** — 48 miles, 6-in., planned, Phillipsburg, Kans., to Holdredge, Neb.

• **Gulf Refining Co.** — 80 miles, 24-in., planned, Midland to Colorado City, Tex.

22 miles, 10-in., planned, Wortham to Corsicana, Tex.

• **Humble Pipe Line Co.**—4, 6, 8, 12-in., proposed, Upton and Reagan counties, Texas.

201 miles, 12-18-in., planned, Hawkins to Baytown, Tex.

14-in., planned, Hawkins to Longview, Tex.

18-in., Longview, Tex., to Tex.-La. border.

• **Interstate Oil Pipe Line Co.**—30 miles, 16-in., planned, Moore to Flora, La. Completion date 1953.

68 miles, 16-in., planned, Raceland to Anchorage, La. Completion date 11-52.

21 miles, 12-in., planned, Duck Creek and Bayou Sale to New Iberia, La. 9-52.

63 miles, 12-16-in., planned, Flora to Bunkie, La. Completion date 12-31-52.

137.6 miles, 22-in., planned, Shreveport to Baton Rouge.

Interstate Oil Pipe Line Co.—55 miles, 16-in., contracted, Sunset to Anchorage, La. Houston Contracting. Completion date 12-52.

• **Magnolia Pipe Line Co.**—29 miles, 8-in., planned, Midland County, Texas area.

Malco Refineries, Inc.—60 miles, 4-in., under way, Pettigrew, Tocito field to Hospah field (San Juan basin, New Mexico).

• **Pan American Pipe Line Co.**—27 miles, 26-in., planned, Genoa to Texas City, Tex. Completion date 12-52.

40 miles, 14-in., planned, Arden Station in Irion County to Eldorado Station in Schleicher County, Texas. 10-52.

Pasotex Pipe Line Co.—195 miles, 8-in., under way, El Paso to Wink, Tex. McVean & Barlow, contractor.

Platte Pipe Line Co.—1,075 miles, 16-20-in., under way, Worland, Wyo., to Wood River, Ill. Completion date 1952.

Worland, Wyo., to Holdredge, Neb. R. H. Fulton & Co., contractor. A. A. Carrigan, spreadman at Scotts Bluff, Neb.

Holdredge, Neb., to Kansas State Line, Fulton & Brodie, contractor, J. T. Brodie, spreadman.

Section 7, Missouri River to Salisbury, Mo., and Section 8, Salisbury to Mississippi River, under way. O. R. Burden Construction Co. Al Perry, spreadman at Carrolton, Mo.; river crossing field office, Hartford, Ill. Dick Jernigan, spreadman.

• **Progress Pacific Pipeline Co.** — 1,100 miles, 24-in., planned, Odessa, Tex., to Los Angeles Harbor, Calif.

Rancho Pipe Line System.—455 miles, 24-in., under way, McCamey to Houston, Tex. Completion date late 1952. (Joint project with Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., Phillips Pipe Line Co., and Ashland Pipe Line Co. with Shell Pipe Line Corp. handling construction and operation.)

McCamey to Cedar Valley near Austin, Tex. Anderson Bros. Corp. A. Kilgore, spreadman at Menard, Tex.

(Segment 1)—Austin to Shell's Deer Park Refinery (Houston area).

(Spread 1)—Brazos River west to Austin, Houston Contracting Co.

• **Roosevelt Oil & Refining Corp.** — 22 miles, 4 and 6-in., planned, St. Helens to Norwich, Mich.

• **Service Pipe Line Co.**—16-in., planned, Bowie, Tex., to Drumright, Okla.

30 miles, 6-in., Knox and Haskell counties, Texas.

29 miles, 4-6-8-in., proposed, Natrona County, Wyoming.

170 miles, 12-in., proposed, Tioga to Williston, N. D.

Shell Pipe Line Corp. — 42 miles, 8-in., Halletsville to LaGrange, Tex.

Sinclair Pipe Line Co.—674 miles, 22-24-in., under way, Drumright, Okla., to East Chicago, Ind. Completion date 1952.

Section 1, Drumright-Cushing, Okla., area, to Humboldt, Kans. O. R. Burden Construction Co.

(Spread 1) Caney to Humboldt, Kans. A. B. Haynes, superintendent at Chanute, Kans.

(Spread 2) Cushing, Okla., to Caney, Kans. Floyd Lewis, spreadman at Hominy, Okla.

Humboldt, Kans., to Salisbury, Mo. R. H. Fulton & Co., contractor. M. L. Boyd and Jerry Nash, spreadmen.

Salisbury, Mo., to Forest City, Ill. O. R. Burden, contractor.

Socony-Vacuum Oil Co., Inc.—20 miles, 8-in-10-in., under way, Hutchinson, Kans. Brown-Lite Contractor.

Southern California Edison Co.—41 miles, 8-in., under way, Etiwanda to Santa Fe Springs, Calif. J. E. Young Pipe Line Contractors, Inc. Jack Cook, spreadman. Completion date 10-15-52.

• **Sterling Pipe Line System.**—53 miles, 12-in., planned, Sterling, Colo., to connection with Platte Pipe Line at Gurley, Neb. (Includes 20 miles, 10-in., main line; 35 miles, 8-in., branch lines). Joint venture comprising Toronto Pipe Line Co., Shell Pipe Line Corp., and Texas Pipe Line Co.

• **Sun Pipe Line Co.**—99 miles, 4-6-8-in., proposed, Scurry County, Texas.

34 miles, 8-in., planned, Jameson to Colorado City, Tex.

20 miles, 8-in., planned, Claytonville to Colorado City, Tex. Completion date 11-1-52.

• **Texas-Empire Pipe Line Co.**—30 miles, 18-in., planned, Wilmington to Lockport, Ill.

Texas Pipe Line Co.—319 miles, 22-12-10-in., under way, Louisiana Gulf Coast to Port Arthur, Tex.

Corsicana to East Houston, Smith Contracting Corp. Frank Craig, spreadman at Teague, Tex. Completion early summer.

Gueydan east to Morgan City, La. Houston Contracting Co. F. A. Silar, superintendent at Abbeville, La.

Houma, La., south through Terrebonne Bay

vicinity. Houston Contracting Co. H. L. Leake, superintendent at Houma.

• **Toronto Pipe Line Co.**—100 miles, 6-10-12-in., planned, Merino, Colo., to Gurley, Neb. Completion date 10-31-52.

• **West Coast Pipeline Co.**—960 miles, 20-22-in., planned, Synder, Tex., to Norwalk, Calif.

West Texas Gulf Pipe Line Co.—466 miles,

1953 will begin with construction of nearly 3,000 miles on crude lines alone.

26-in., under way, Colorado City, Nederland, Tex. Anderson Bros. Completion date 1-1-53.

(Spread 1) Wortham to Longview, Tex. 10-52. Anderson Bros.

(Spread 2) Glenrose, Tex. Anderson Bros.

(Spread 3) Colorado City to Abilene, Tex. Anderson Bros.

(Spread 4) West of Wortham. Anderson Bros.

(Spread 5) Big Spring to Colorado City. Anderson Bros.

(Spread 6) East of Abilene Associated Pipe Line Contractors.

20-in., Wortham to Henderson County, Tex. Panama-Williams Co., contractor.

Products Pipe Lines

• **Bell Oil & Gas Co.**—150 miles, 6-8-in., planned, Ardmore to Drumright, Okla. Completion date 6-1-53.

Buckeye Pipe Line Co.—370 miles, 8-12-16-in., under way, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y. (Sections divided as follows: 75 miles, 16-in., 218 miles, 12-in., 77 miles, 8-in.). Completion of 16-in., 1952, balance 1953.

77 miles, 16-in., under way, Macungie, Pa., to Linden, N. J. H. L. Gentry Const. Co. F. K. Morris, spreadman at Manville, N. J. Completion date 10-15-52.

• **Costal Products Pipe Line Co.**—260 miles, 20-in., proposed, Houston to Baton Rouge.

Derby Oil Co.—30 miles, 4-in., under way, Wichita to Bell, Kans.

Gulf Refining Co.—78 miles, 8-in., under way, Port Arthur to Deer Park, Tex.; Glaser Const. Co., Barry Const. Co.

28 miles, 8-in., under way, El Vista to Orange, Vawter Const. Co., I. R. Stewart Const. Co.

• **Harbor Products System**—86 miles, 16-in., planned, Philadelphia to Trembley Point, N. J. (Joint ownership of Sinclair Pipe Line Co., Gulf Oil Corp., and Texas Co.)

Indiana Farm Bureau Cooperative Association, Inc.—180 miles, 80-in., under way, Mt. Vernon to Indianapolis, Ind. R. B. Potashnick, contractor.

70 miles, 4-in., under way, Indianapolis to Peru, Ind. R. B. Potashnick, contractor.

• **Keystone Pipe Line Co.**—60 miles, 12-in., proposed, Pt. Breeze, Pa., to Montello, Pa. Completion date 12-31-52.

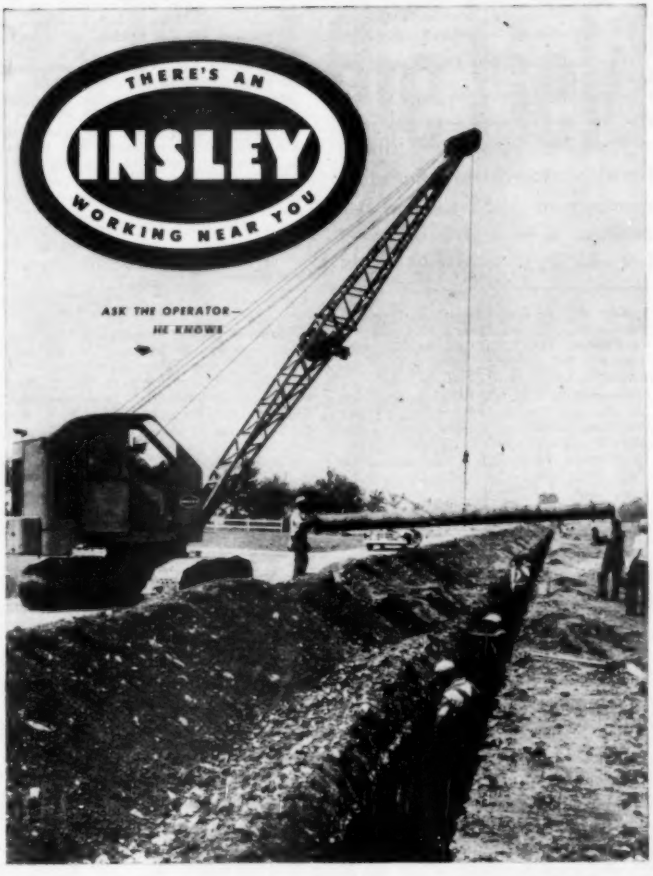
Ohio Oil Co.—255 miles, 8-10-in., East St. Louis, Ill., to Indianapolis. Conyes Const. Completion date 11-52.

• **Phillips Petroleum Co.**—50 miles, 8-in., planned, Goldsmith to Spraberry, Tex. Completion date 11-52.

54 miles, 6-in., planned, Goldsmith to Borger, Tex.

Phillips Pipe Line Co.—35 miles, 6-in., contracted, Okmulgee, Okla., to Tulsa. Completion date 10-52.

68 miles, 12¾-in., under way. Osawatomie westward to Wichita, Kans. Brown Lite Co. R. E. Carriker, spreadman at Osawatomie, Kans.



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40 miles, 10-in., through Monteau, Cole, Osage, and Gasconade counties, Missouri. Trojan Const. Co. E. L. Maggard, spreadman at Linn, Mo.

Under way, Paola, Kans.-Harrisonville, Mo. Smith Construction Corp.

74 miles, 8-in., under way, looping from Decatur, Ill., to East Chicago, Ind. Somerville Const. Co., contractor.

Products lines move along steadily toward completion winding up 1952 jobs in December with small lap-over into 1953.

• **Phillips Pipe Line Co.** — 137 miles, 10-in., planned, looping from Paola, Kans., to East St. Louis, Ill.

Pioneer Pipe Line Co.—(Continental Pipe Line Co. and Sinclair Pipe Line Co.). 310 miles, 8-in., under way, Sinclair, Wyo., to Salt Lake City, Utah.

• **Progress Pacific Pipe Line Co.** — 900 miles, 10-in., proposed, California to West Texas.

Salt Lake Pipe Line Co.—330 miles, 8-in., contracted, Salt Lake City to Boise, Idaho. Macco Corp., and Engineers, Ltd.

Shell Oil Co.—565 miles, 8-14-in., under way, Wood River via East Chicago to Detroit. R. B. Potashnick, contractor on Wood River—E. Chicago portion of project.

• **Sinclair Pipe Line Co.**—8-10-in., planned, Sinco to Port Arthur, Tex.

• **Standard Oil Co. (Ind.).**—316 miles, 12-in., proposed, Sugar Creek refinery to Dubuque, Iowa. Completion date 1-1-53.

• **Standard Oil Co. (Ohio).**—17 miles, 6-in., planned, Toledo to West Toledo, Ohio.

Sun Pipe Line Co.—110 miles, 8-in., under way, Fostoria to Hudson, Ohio.

Tuscarora Oil Co.—74 miles, 6-10-12-in., under way, Allentown to Midland, Pa.

• **United States Pipe Line Co.**—1,600 miles, 14-22-24-in., proposed, Port Neches, Tex., to Newark, N. J. (Includes 560 miles, 25-in., Port Neches to Jackson, Tenn.; 120 miles, 14-in., lateral to Paducah, Ky., and 1,045 to Newark).

• **Wolverine Pipe Line System**—200 miles, 14-in., planned, Chicago to Toledo and Detroit. (Joint ownership of Shell, Texas, and Cities Service).

Natural-Gas Pipe Lines

Algonquin Gas Transmission Co. — 160 miles, 24-26-in., under way, New Jersey to Connecticut River near New Haven. Williams Brothers, contractor. Robert L. Buck, project manager, Danbury, Conn. Spreadmen: Thelmer Davis, Waterbury, Conn., O. L. Martin, Sloatsburg, N. Y., O. R. Mitchell, Danville, N. J.

• **Allied Gas Co.**—24 miles, 6⅝-in., proposed, McLean to Champaign County, Illinois.

• **Arkansas-Missouri Power Co.** — 140 miles, 2 to 10-in., planned, St. Francis River, Clay County, Arkansas, to near Campbell, Mo.

• **Associated Natural Gas Co.**—88 miles, Missouri.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

Cities Service Gas Co.—179 miles, 4-30-in., gathering system in vicinity of Ulysses, Kans. Vaughn & Taylor Construction Co., Inc. D. D. Vaughn, spreadman, Ulysses.

15 miles, 20-in., Craig County, Oklahoma, to Lawrence County, Missouri.

Cities Service Gas Co.—21 miles, 26-in., planned, Franklin and Anderson counties, Kansas.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

Colorado Interstate Gas Co.—250 miles, 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R. H. Fulton & Co., contractor. Jerry Nash spreadman at Lamar, Colo.

Pueblo County to Fowler, Colo.

• **Commonwealth Natural Gas Corp.**—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

Dow Chemical Co.—70 miles, various sizes, Midland, Saginaw, and Bay City, Mich. Mahoney Contracting Co., contractor. Ralph Bucher, spreadman at Midland.

• **East Tennessee Natural Gas Co.**—172 miles, 22-in., planned, Greenbrier to Oak Ridge, Tenn.

100 miles, 16-in., proposed, Knoxville to Kingsport, Tenn.

• **El Paso Natural Gas Co.**—170 miles, proposed, looping along main line in Texas, New Mexico, Arizona.

36 miles, 24-in., proposed, looping from Kingman to Franconia, Ariz.

• **Frederick Gas Co.**—26 miles, 4-in., planned, Redlands to Frederick, Md.

• **Georgia Gas Co.**—32 miles, 4½-in., proposed, Bogart to Gainesville, Ga.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

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91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

• **Gulf Interstate Gas Co.**—1,000 miles, 30-in. planned, Gulf Coast to North Kentucky.

• **Home Gas Co.**—32 miles, 12-in., planned, Breesport to Union Center, N. Y.

With summer nearly over it's a hurried deadline from now until December.

17 miles, 12-in., proposed, loops from Hancock to Sanford, N. .

• **Hope Natural Gas Co.**—33 miles, 8-10-12-in., planned, Wyoming County, West Virginia, south to Buchanan County, Virginia.

Houston Pipe Line Co.—50 miles, 16-in., under way, Edna to Tom O'Connor. Completion date 9-1-52.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., planned, Washington County to Cedar Rapids, Iowa.

Iowa-Illinois Gas & Electric Co.—¾ to 6-in., under way, Davenport, Iowa, and Moline, Ill. C. E. Wilson Const. Co.

• **Kansas-Nebraska Natural Gas Co., Inc.**—179 miles, proposed, Kansas and Nebraska.

20 miles, 16-12-in., planned, Hastings to Grand Island, Neb. Completion date 1952.

18 miles, 6-8-in., planned, McCook, Neb., south. Completion date 1952.

54 miles, 4-6-in., planned, Neligh to Hartington, Neb. Completion date 1953.

49 miles, 10-in., planned, Ogallala to North Platte, Neb. Completion date 1952.

20 miles, 12-in., planned, Atwood to near Oakley, Kans. Completion date 1952.

• **Kansas Power & Light Co.**—27 miles, 20-in., planned, Pratt, Kans., to Calista compressor station.

28 miles, 12-16-in., planned, north of Kansas to Meade County gas field.

• **Lake Shore Pipe Line Co.**—45 miles, 10¾-in., planned, northwesterly from T.G.T. system near Meadville, Pa., to Ashtabula, Ohio. Harford Bros., contractor.

• **Lone Star Gas Co.**—100 miles, proposed, storage fields to the Dallas-Fort Worth area.

35 miles, 12-in., proposed, southeastern Schleicher County.

70 miles, 20-in., planned, Garvin County, Oklahoma, to Clay County, Texas.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

Michigan Gas Storage Co.—93 miles, 16-22-24-in., under way, Laingsburg to near Pontiac and Mount Clemens, Mich. (Includes 17 miles of lateral lines.) Mahoney Contractor.

• **Michigan Gas Storage Co.**—30 miles, 26-in., planned, looping between Laingsburg and Mount Pleasant Junction, Mich.

Michigan Gas Utilities Co.—77 miles, under way, Sturgis, Hillsdale, and Coldwater, Mich. (22.7 miles, Marshall south to Coldwater; 20 miles, Coldwater easterly to Hillsdale; 22.5 miles, Hillsdale to Sturgis, 11 miles, Hillsdale to Jonesville.) Somerville Const., contractor, Jim Godwin at Coldwater.

• **MidSouth Gas Co.**—240 miles, proposed, Greene, Poinsett, Crittenden, St. Francis, Lee, Phillips, Monroe, Woodruff, and Cross counties, Arkansas.

Minneapolis Light & Power Co.—20 miles, 30-in., under way, Minneapolis, Williams Brothers, contractor. F. W. Caldwell, spreadman.

• **Mississippi River Fuel Corp.**—98 miles, 16 and 18-in., planned, feeder line from Lincoln Parish, Louisiana, to Waskom field, Harrison County, Texas.

40 miles, 18-in., planned, Dubach to Perryville, La.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

• **Montana Power Co.**—52 miles, 16-in., planned, Canada-Montana border to Cut Bank, Mont.

• **Morganfield Natural Gas Co.**—31 miles, 4-6-in., planned, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

• **National Utilities Co. of Michigan.**—77 miles, 20-in., proposed, South Central Michigan. (22 miles from near Marshall south to Coldwater; 20 miles east of Hillsdale; 22 miles southwest to Sturgis; 5 miles from Hillsdale to Jonesville and 8 miles west to Union City.)

• **Nevada Natural Gas Pipe Line Co.**—114 miles, 10-in., proposed, Topock, Ariz., to Las Vegas, Nev.

• **New River Gas Co.**—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **New York State Electric and Gas Co.**—59 miles, 8-10-24-in., proposed, Oneonta and Norwich to DeRuyter, N. .

New York State Natural Gas Corp.—104 miles, 14, 16, 20-in., under way, looping

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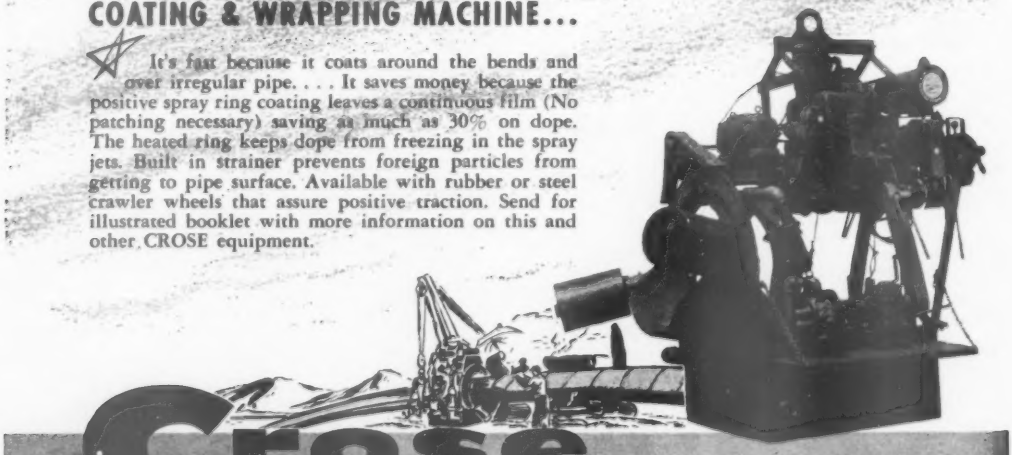

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Angelica to Rossburg, N. Y. (begin at completion of Cayuta-Ithaca). Williams-Austin. Howard Bauer, superintendent. Completion in 45 days.

Colesburg Junction to Sabinsville, Pa. (begin at completion of Angelica job), Williams-Austin. Howard Bauer, superintendent.

21 miles, Columbiana and Stark counties, Ohio.

• **New York State Natural Gas Co.**—95 miles, 16-20-in., proposed, Clinton County to Armstrong County, Pennsylvania.

(Section 1) 16-in., Clinton County, Pennsylvania.

(Section 2) 20-in., Armstrong County, Pennsylvania, begin 1953.

Niagara Mohawk Power Corp.—55 miles, 10-in., Fulton to Watertown, N. Y.; Williams-Austin Co., contractor. Howard Bauer, superintendent. Completion date 9-52.

20 miles, 10-24-in., under way, Syracuse, N. Y. H. L. Gentry Const. Co., contractor. Bob Cantrell spreadman at Syracuse. Completion date 10-1-52.

Northeastern Gas Transmission Co.—221 miles, 20-24-in. under way, New Hampshire, Massachusetts, and Connecticut, Bethel Corp. Completion date 9-52.

• **Northeastern Gas Co.**—411 miles, proposed, New England towns.

• **Northern Natural Gas Co.**—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

210 miles, 26-in., proposed, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

400 miles, 24-in., proposed, Emerson, Manitoba south to Red River Valley through Fergus Falls on to St. Paul, Minn.

102 miles, planned, extension.

Northern Natural Gas Co.—140 miles, 4-6-8-in., under way, south of Rolla, Kans., to Guymon, Okla. Reese Bros. Const. Co. E. H. Reese, spreadman at Hugoton, Kans.

Natural-gas operations reveal a great number of uncontracted projects—still more proposals.

• **Northern Indiana Fuel & Light Co.**—33 miles, 8-in., proposed, Edgerton to Auburn, Ind.

• **Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

24-in., Eastport, Idaho, to Monroe, Wash.

18-in., Monroe to International boundary near Lynden, Wash.

22-in., Monroe to near Seattle, Wash.

20-in., Seattle to Portland, Ore.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

• **Oklahoma Natural Gas Co.**—50 miles, 18-in., planned, Pryor, Okla.

• **Pacific Gas & Electric Co.**—50 miles, 12-16-20-in., planned, Fresno to Merced, Calif.

(Section 1) 16-in., Burrel to near Easton, Calif.

(Section 2) 20-in., Holm to Topock-Milpitas line.

(Section 3) 12-in., parallel existing Madera-Livingston line.

141 miles, 34-in., proposed, parallel sections along Topock-Milpitas line.

Planned, Monterey to Fort Ord to Castroville; Napa Wye to Shellville; Cotati to Santa Rosa, Calif.

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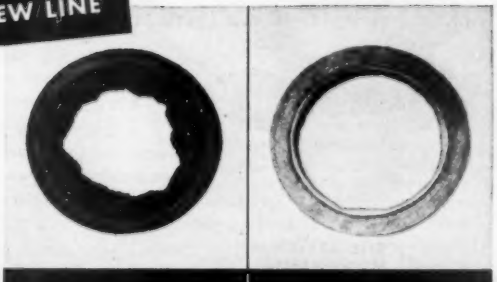

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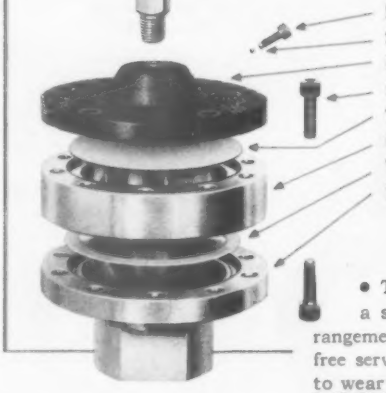
FEATURES



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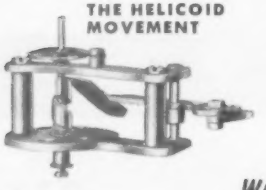

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• **Pacific Northwest Natural Gas Co.**—Proposed, San Juan Basin, N. M., to Oregon and Washington.

Panhandle Eastern Pipe Line Co.—70 miles, 24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

174 miles, 30 and 26-in., contracted. Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor.

26-in., Edgerton, Mich., Anderson Brothers.

30-in., looping in Tuscola, Ill.

30-in., looping in Montezuma, Ind.

30-in., looping in Zionsville, Ind.

Pennsylvanian Gas Co.—52 miles, 12-in., between Warren and Erie, Pa. Section 1—27 miles, under way and contracted by Harford Brothers, Section 2—25 miles.

• **Peoples Natural Gas Co.**—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

• **Permian Basin Pipeline Co. (Northern Natural).**—384 miles, 20-30-in., proposed, Permian Basin and eastern New Mexico to Skellytown, Tex.

Upton County, Texas, to Lea County, New Mexico.

Lea County to Roosevelt County, New Mexico.

Roosevelt County, New Mexico, to Carson County, Texas.

Phillips Petroleum Co.—250 miles, 30-in., under way, gas gathering system, Midland and Glasscock counties, Texas, Vaughan & Taylor Const. Co. Completion date 10-52.

Phillips Petroleum Co.—200 miles, 2 to 30-in., planned, Midland, Upton, Glasscock, and Regan counties, Texas. Completion date 5-53.

65 miles, 4 to 30-in., planned, Goldsmith field system, Texas. Completion date 1-53.

28 miles, 10-in., planned, Bayou Plant to Adams Terminal. Completion date 7-53.

Piedmont Natural Gas Co.—36 miles, 8-10-12-in., under way, west of Greensboro to Burlington, N. C. Gragg Construction Co. Hubert Gragg, supt., at Greensboro.

• **Public Service Co. of Colorado.**—95 miles, proposed, Douglas Creek and other gas fields to Grand Junction, Colo., area.

• **Public Service Co. of North Carolina.**—83 miles, 8-in., planned, Kings Mountain to Asheville, N. C. Completion date 3-1-53.

• **Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins, Cove, N. Y.

• **Shenandoah Gas Co.**—39 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va.

• **South Carolina Natural Gas Co.**—160 miles, 16-12-10-in., proposed, Aiken, S. C., to cities of Columbia, Summerville, and Charleston, S. C.

• **South Georgia Natural Gas Co.**—339 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga. (b) 10-in., Albany, Ga., to Moultrie, Ga. (c) 8-in., Moultrie, Ga., to Tallahassee.

• **Southern California Gas Co.**—35 miles, planned, Antelope Valley, California.

• **Southern California Gas Co. and Southern Counties Gas Co. of California.**—45 miles, 30-in., proposed, looping on line from Arizona border to Los Angeles.

81 miles, 30-in., proposed, Whitewater to Desert Center, Calif.

• **Southern Natural Gas Co.**—1,235 miles, 24 to 4½-in., proposed, Louisiana, Mississippi, Alabama, and Georgia.

169 miles, loops, Ouachita Parish, Louisiana, to Augusta, Ga.; 20 miles in Ouachita Parish, 33 miles in Ouachita and West Carroll parishes; 7 miles, Sharkey County, Mississippi; and 108 miles, 14-in., Bass Junction to Augusta, Ga.

• **Southern Union Gas Co.**—21 miles, 20-in., planned, Albuquerque, N. M.

27 miles, 10-in., planned, Lea and Eddy counties, New Mexico.

Southern Union Gas Co.—30 miles, 12-20-in., contracted, San Juan County, New Mexico. R. H. Fulton & Co.

• **Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

Tennessee Gas Transmission Co.—591 miles, 24-30-in., under way, looping along present system (consisting of 323 miles of 30-in.; 167 miles of 26-in.; 101 miles of 24-in.)

420 miles, 30-in., Texas, Louisiana, Arkansas, Mississippi, Tennessee, and Kentucky.

101 miles, 26-in., Kentucky and Ohio.

304 miles, 24-in., proposed, Mercer, Pa., to Utica, N. Y.

202 miles, 20-26-30-in., proposed, Buffalo to Canada.

116 miles, 30-in., under way; three loops, from Refugio to Cleveland, Tex.; Oklahoma Pipe Line Constructors. Ed Flanagan, Victoria, Tex.

80 miles, 26-in., contracted, Harrison County to Jackson County, Ohio. H. C. Price & Co., contractor.

(Spread 1—Carrollton, Ohio, southwestward to Harrison County, Ohio. H. C. Price Co., contractor.

(Spread 2)—Athens, Ohio, to Jackson County, Ohio. H. C. Price Co., contractor.

126 miles, 30-in., under way, Arkansas, Louisiana, and East Texas. Houston Contracting Co.

(Spread 1) Gallion, La. Houston Contracting. W. H. Hayes, superintendent, M. L. Thompson, assistant superintendent.

(Spread 2) Eros, La., to Coldwater, La. Houston Contracting. F. A. Silar, superintendent.

(Spread 3) Sabine River south to Jasper Compressor Station. Houston Contracting. E. C. Norris, superintendent. R. E. Thornton, assistant superintendent.

(Spread 2) Under way, Marshall County to Tippah County, Mississippi. 9-10-52.

• **Texas Eastern Transmission Corp.**—315 miles, 24-in., proposed, Provident City, Tex., to Castor, La.

• **Texas Gas Transmission Corp.**—400 miles, 26-in., planned, looping from Bastrop, La., to Hardinsburg, Ky.

180 miles, 26-in., Acadia Parish to connection with existing facilities in Morehouse Parish.

35 miles, 12-in., Slaughters, Ky., to Evansville, Ind.

560 miles, 26-in., proposed, Louisiana and Kentucky.

Texas Gas Transmission Corp.—Under way, Mississippi River near Greenville, Mississippi to Jeffersontown Station, Ky. H. C. Price Co. Charlie Ice, supt., at Cleveland, Miss. Completion date 11-15-52.

26-in., under way, Bastrop, La., to north of Mississippi River. W. H. Hayes, superintendent. Houston Contracting.

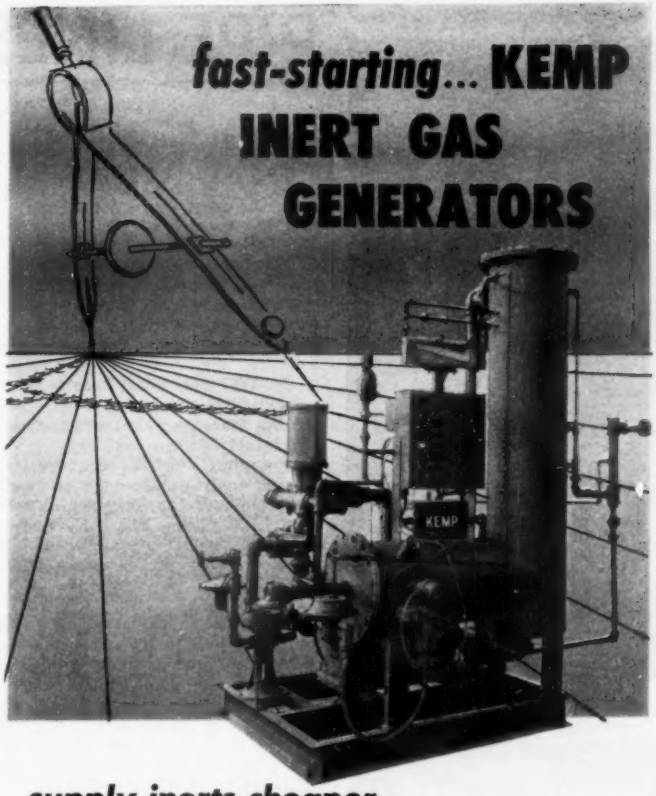
• **Texas-Ohio Gas Co.**—1,435 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va. Completion date 6-30-53.

• **Union Oil Co. of California.**—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles basin.

United Gas Pipe Line Corp.—70 miles, 30-in., under way, Houston to So. Bank of Trinity River, Tex., Louis Visentine, Conroe, Tex.

510 miles, 20 to 30-in., under way, Agua Dulce, Tex., to Monroe, La. River Const. Corp., contractor.

(Spread 1) 30-in., from Pearl River north and south of Jackson, Miss. Red Tafum, superintendent at Jackson.



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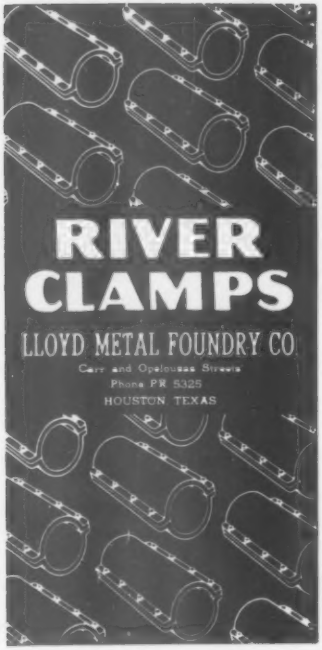

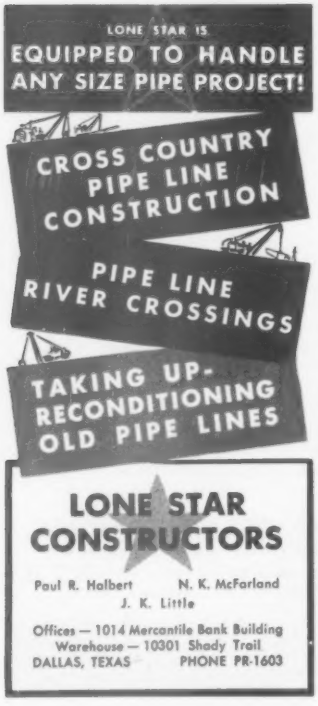

PIPE LINES

Gain in Capacity

FPC o.k.'s 1.25 billion cubic feet in first half

WASHINGTON. — Natural-gas pipeline facilities authorized by the Federal Power Commission during the first half of 1952 will add more than 1,250 million cubic feet of daily delivery capacity to the nation's natural-gas network.

The FPC reports that these facilities include 1,915 miles of pipe lines and have an estimated total construction cost of $235,421,000.

One project, that of Tennessee Gas Transmission Co., accounted for most of the mileage and investment. More than 1,100 miles of line is involved in this $128,216,000 project which will increase capacity of Tennessee's system by 205 million cubic feet a day.

For fiscal year . . . During the fiscal year ended last June 30, the commission authorized construction of 3,378 miles of pipe lines and installation of 539,510 hp. in compressor units at a total estimated cost of $321,919,895. This will increase the industry's gas pipe-line capacity by more than 1,500 million cubic feet daily.

These totals were considerably under those for the fiscal year 1951, in which 8,695 miles of line and 736,135 hp. in compressors was authorized at an estimated cost of $725,432,984—the highest figures for any year since enactment of the certificate provisions of the Natural Gas Act.

Texas Eastern Revises Plans For Texas Gas-Supply Line

SHREVEPORT.—Texas Eastern has revised its plans slightly for construction of a 315-wide natural-gas-transmission line from Provident City, Tex., to Castor in Bienville Parish, Louisiana.

In an amended application to the Federal Power Commission in Washington, Texas Eastern changed specifications for the line to provide for a daily throughput of 140,000,000 cu. ft. of gas daily, instead of the 200,000,000 cu. ft. originally called for. Estimated cost of construction was reduced from $25,943,079 to $23,283,540.

Other changes involved abandoning plans to build a 5,500-hp. compressor station and reducing wall thickness of the 24-in. pipe slightly.

The new gas supply still would be used to carry out previously authorized service.

The southern terminus of the line at Provident City in Lavaca County is in one of the major gas-producing areas of the Southwest. The company currently purchases all of its gas supply from this area.

Oil Shipments Off

Both volume and revenue decline in second quarter

WASHINGTON.—Both volume and revenue of petroleum pipe-line companies declined in the second quarter of this year, from both the preceding quarter and the corresponding quarter last year.

Reports filed with the Interstate Commerce Commission showed that in the second quarter 53 large companies handled 749,863,793 bbl. of oil against 793,403,826 bbl. in the corresponding quarter last year and had transportation revenue of $117,398,603 against $121,600,259.

In the first quarter, 54 companies handled 839,513,910 bbl. of oil against 747,725,595 bbl. in the same 1951 period and had transportation revenue of $130,834,913 against $117,167,798.

The company covered in the first-quarter report but not in the second was South West Pennsylvania Pipe Lines, but its first-quarter volume of 2,398,419 bbl. did not substantially affect the second-quarter decline.

Only 14 of the 53 companies reported that they moved more oil in the second quarter than in the first.

Humble ahead in volume . . . Among the leaders there were a number of shifts in relative position with the second-quarter standings as follows: Humble Pipe Line Co., 70,411,386 bbl. against 77,447,903 bbl. in the first quarter; Texas Pipe Line Co., 44,937,994 bbl. against 51,188,411 bbl.; Buckeye Pipe Line Co., 44,592,203 bbl. against 49,536,753 bbl.; Interstate Oil Pipe Line Co., 44,548,932 bbl. against 46,467,162 bbl.; Gulf Refining Co., 44,404,363 bbl. against 51,381,782 bbl.; Service Pipe Line Co., 38,011,529 bbl. against 45,159,571 bbl.; Sinclair Pipe Line Co., 37,193,623 bbl. against 44,190,779 bbl.; Ohio Oil Co., 35,251,750 bbl. against 36,642,686 bbl.; Mag-

nolia Pipe Line Co., 34,782,351 bbl. against 43,222,095 bbl., and Shell Pipe Line Corp., 28,664,246 bbl. against 38,565,442.

Service leads in revenue . . . Leading in revenue from transportation was Service Pipe Line Co. with $11,426,495; Humble Pipe Line Co., $10,001,383; Sinclair Pipe Line Co., $8,021,571; Great Lakes Pipe Line Co., $7,750,379; Texas Pipe Line Co., $6,989,886; Gulf Refining Co., $6,794,567; Shell Pipe Line Corp., $6,354,486; Magnolia Pipe Line Co., $6,352,432; Interstate Oil Pipe Line Co., $5,188,281; and Phillips Pipe Line Co., $4,592,199.

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Ohio Fuel Gets Approval Of Two New Lines in Ohio

WASHINGTON.—Ohio Fuel Gas Co., Columbus, has been granted temporary authorization by the Federal Power Commission to lay and operate 37 miles of various-diameter gas lines on its system in Ohio.

The company would lay two new lines—both to replace existing lines which now are too small to meet current demands.

The largest of the two, a 33-mile, 20-in. line from a point in Crawford County, will replace an existing 42-mile line of 8⅝ and 10¾-in. pipe at a cost of about $1,500,000.

A 4-mile, 8⅝-in. line will replace a 6⅝-in. line in Richland and Crawford counties at a cost of about $92,500.

The new lines would protect service to the Findley, Tiffin, Fostoria, and Shelby market areas.

Rancho to Resume Operations

HOUSTON.—Shell Pipe Line Corp. has revealed that full-scale construction operations on the 455-mile, 24-in. Rancho Pipe Line should be resumed by October 1.

Operations were delayed considerably by shortages of pipe resulting from the steel strike. Hopes that construction can be resumed by the October date were given some substance when Shell recently obtained a poststrike rolling schedule from the steel mills.

Construction on the line has been confined to river-crossing and compression-station work since July 11, when contractors ran out of pipe.

The Rancho line will extend from McCamey in the Permian basin producing area of West Texas to the Houston-Texas City refining area.

Northern Natural Asks Permit

WASHINGTON.—Northern Natural Gas Co. has applied to the Federal Power Commission for permission to build facilities to supply natural gas to a proposed nitrogen-fertilizer plant to be built near La Platte, Neb.

Northern Natural's application said it would build 6½ miles of 30-in. loop line from its Bushton, Kans., compressor station in Rice County to a point in Ellsworth County and would build a 1.4-mile, 8⅝-in. line from Northern's Omaha branch line to a proposed regulating station at the fertilizer plant site in Sarpy County, Neb. The company also plans to add capacity in its compressor station at Hugoton, Kans.

Total cost of the project, Northern Natural said, would be $952,000.

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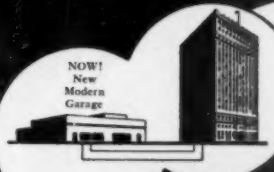

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Among the

Drilling Contractors

Natchez Contractor Has Nine-Well Drilling Deal

Barnett Serio, contractor and independent operator, Natchez, Miss., has taken on a 3,000-acre, Stanolind Oil & Gas Co. "farm-out" in the Dismal Swamp area of Concordia Parish involving the drilling of 9 exploratory wells. He plans to drill the wells consecutively, starting the first this month. All wells will be carried to the Wilcox, expected at depths of 7,500 to 7,700 ft. The farm-out involves lands of Angelina Hardwood Co., J. O. Quinn, C. C. Miller, and First National Bank of Hattiesburg (Mississippi) in parts of Townships 3n and 4n and Ranges 6e, 7e, and 8e.

Wheless Drilling Co., Shreveport, has the contract for a proposed 9,000-ft. Cotton Valley exploratory test which Sohio Petroleum Co. is starting 3½ miles south of the Point field, in southern Union Parish, Louisiana. The test will be carried as 1 Calloway, with location in the C NW NE 32-19n-2e. Production in the Point field is from the shallow Travis Peak formation.

Noble Drilling Co., Tulsa, has taken on a contract to deepen an old dry hole which Sohio Petroleum Co. has taken over in the Five Mile area in southern Big Horn County, Wyoming, and northwest of the Worland field in Washakie County. The test, 1 Government-Coltrane, drilled in 1947 and abandoned as dry in the Frontier sands at a total depth of 9,430 ft., will be deepened to the Phosphoria zone, producing horizon in a discovery well, ½ mile to the southeast, drilled by Husky Oil Co. in 1951, and also in the Worland field, further southeast.

H. B. Lynn Drilling Co., Tulsa, has contracted with Tide Water Associated Oil Co. to deepen an old dry hole, located just south of Pauls Valley, Garvin County, Oklahoma. The hole, 1 Derdeyn, NE NW SW 19-3n-1e, was abandoned in 1939 at a depth of 4,434 ft. It will be deepened to 5,400 ft. or the Arbuckle.

Curtis & Lomax, Midland, Tex., will drill a 5,700-ft. test for A. A. Cameron and associates at a wildcat location 3 miles northeast of Bronte, in the central eastern part of Coke County, West Central Texas. Location is for 1 Burner, in Section 394, Block 1-A, H&TC Survey. It is more than 2½ miles from nearest production.

Kemp Drilling Co., Shreveport, has the contract for another well which Pan Am Southern Corp. is starting in the recently opened Bordelonville field, in Avoyelles Parish, Louisiana. The new operation, 1 T. P. Bordelon, will be the first attempt to confirm

Two tool pushers, Earl Crone (left) and Sam Davis with Allen Fogle, driller, on a rig which Harrell Drilling Co., Houston, is running on an extension location in the Bammel field, Harris County, Texas Gulf Coast. Photograph by courtesy of Mission Manufacturing Co., Houston.

The man on the rig knows that for a tight seal and easy separation of parts you can't beat 'Bestolife Lead Seal Tool Joint and Casing Compound. Standard of the oil industry for 20 years. Unconditionally guaranteed. Sold and exported by supply houses throughout the world.

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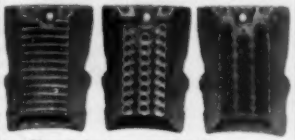

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the discovery of the pool, opened by Sohio Petroleum Co. and Pan Am Southern at their 1 S. V. Bordelon, completed in July. Objective is the Wilcox around 8,450 ft.

Buffalo Drilling Co., Casper, Wyo., is drilling for Sinclair Oil & Gas Co. at a recently started extension test in the East Salt Creek area, Natrona County, Wyoming. Location is in the SE SW SE 4-40n-78w.

Northern Drilling & Production Co. has a rig under contract to Moore & Gilmore for a wildcat test, now drilling, in the Horse Creek area, in Laramie County, Wyoming. The test is designated as 1 Nimmo Livestock Co. Location is in the NE NE NE 18-17n-67w.

Roeser & Pendleton, Inc., Fort Worth, contracting for Sun Oil Co., will drill a deep test at a wildcat location 6 miles west of Kiln, in Hancock County, southern Mississippi. The test, 2 Weston, located in 6-8s-15w, is scheduled to go to 12,500 ft. with the lower Cretaceous section as its objective.

Schafer Drilling Co., Oklahoma City, has a rig working for Rogers-Fain Drilling Co., also of Oklahoma City, at a wildcat location 2 miles southeast of Chandler, Lincoln County, Oklahoma. The test, scheduled to go to the Wilcox sand with contract to 5,100 ft., is listed as 1 Clinkenbeard. Location is in the NE NE SW 23-14n-4e.

Skiles Oil Corp., Mount Carmel, Ill., has a rig running for J. E. Manning at a wildcat location in the Willard area, Logan County, Colorado. The operation is 1 Bamford, NE NW NW 30-7n54w.

ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area—	Week ended 9-1-52	Change week ended 8-25-52	Change week ended 9-3-51
Gulf Coast	485	+ 7	−116
N. & W. Tex.-N. M.	744	+10	−243
Ark.-N. La.-E. Tex.	133	+ 6	− 33
Oklahoma	302	+13	− 9
Kansas-S. Nebraska	146	0	− 46
Illinois-Eastern	135	− 6	− 4
Rocky Mountains	250	+12	+ 59
Pacific Coast	157	− 3	− 26
Total U. S.	2,352	+39	−418
Western Canada	166	+ 9	+ 9
Total	2,518	+48	−409

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Rocky Mountains and western Canada areas are shown on pages 172 and 173.

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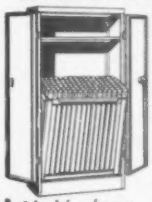

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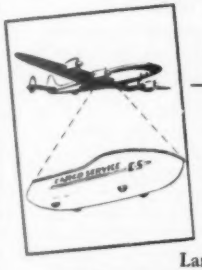

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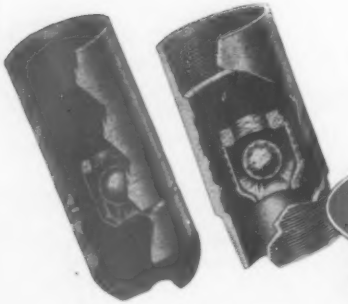

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NATURAL GAS

Reservations Pour in

More than 5,000 persons so far have signed up to attend what the A.G.A. anticipates will be its biggest meeting

NEW YORK.—An advance program for what is billed as by far the biggest annual meeting yet staged by the American Gas Association has been released by F. A. Lydecker, vice president of Public Service Electric & Gas Co., Newark, N. J., and chairman of the A.G.A. general-convention committee.

Lydecker reports that more than 5,000 persons so far have made advance reservations to date for the Atlantic City meeting October 27-30.

The Operating Section of A.G.A. will conduct full programs the afternoon of October 28, the morning of October 29, and the afternoon of October 30 at the Hotel Ambassador. The program in detail follows:

October 28 . . . "Synthetic Liquid and Gaseous Fuels," Dr. W. C. Schroeder, U. S. Bureau of Mines, Washington, D. C.; "Gas Conditioning"; "Economics of Corrosion Control"; and "Economics of Fleet Operation" (speakers not announced for the latter three).

October 29 . . . A talk on reserves and projected demand for natural gas and the economics of substitution, by C. F. DeMey, Columbia Gas System Service Corp., New York; E. L. Henderson, United Gas Corp., Shreveport, will present a paper on odorization and preside over a panel on the same subject.

October 30 . . . Report of nominating committee and election of officers; report on the "Gas-Engineers Handbook," by F. E. Vandaveer; safety reports by H. Bruce Andersen and F. H. Bunnell; report of special committee on piping on customers' presmises by A. C. Cherry; report of chemical committee by E. G. Hammerschmidt; report of corrosion committee by A. D. Simpson, Jr.; distribution committee by C. L. Hulswit; purging committee by G. R. King. Those reporting are chairman of committees named.

General sessions . . . Charles E. Bennett, president of A. G. A. and of Manufacturers Light & Heat Co., Pittsburgh, will review the immediate past and forecast the future for the industry in an address entitled "Where Will We Be in '53" at the convention's first general session October 27. The first session also will head a talk on emergency labor disputes and other labor problems by Prof. Sumner H. Slichter, Harvard University.

Speakers at the general session October 28 will hear addresses by Frank C. Smith, president of Houston Natural Gas Corp. and first vice president of A.G.A., on sales promotion; Louis Ruthenburg, president of Gas Appliance Manufacturers Association, on coordination of activities of gas utilities and appliance manufacturers; and by Dr. Gustav Egloff, Universal Oil Products Co., on the place of gas in the present and future economy of the nation.

The third general session October 30 will feature addresses by D. A. Hulcy, president of Lone Star Gas Co. and chairman of the board of the United States Chamber of Commerce, on public relations; and by Maryland Sen. Herbert R. O'Conor on utility regulation, national or local.

A.G.A.'s accident - prevention committee has lined up a comprehensive program on all phases of safety in operations for its general meeting in the Ambassador Hotel the morning of October 29.

Two Big Firms Protest Tax

AUSTIN.—Two of three big gas companies which previously have gone along paying Texas' embattled gas-gathering tax now have decided to join the list paying the tax under protest.

They are United Gas Pipe Line Co., and Tennessee Gas Transmission Co.—the former protested paying $100,152 for July, the latter $118,350. The sole remaining major firm still not protesting payment of the tax is El Paso Natural Gas Co., which paid $83,381 for July.

Connecticut Gets First Gas

TORRINGTON, Conn. — Connecticut has been added to the list of states now receiving natural gas.

Gas from the Southwest was delivered recently to customers here, by Connecticut Power Co. It was moved to the distributing utility by Tennessee Gas Transmission Co. and Northeastern Gas Transmission Co.

Algonquin Gas Transmission Co., which is affiliated with Texas Eastern Transmission Corp., also is building a line into Connecticut and other New England markets. Algonquin and Northeastern have Federal Power Commission certificates under which each will serve a part of the New England market.

Natural Gasoline

Analysts' School

N.G.A.A., Oklahoma Univ. join to offer first course

NORMAN, Okla.—Opening here October 6 under the sponsorship of the Natural Gasoline Association of America will be the first school designed specifically for the study of low-temperature fractional analysis of petroleum gases and liquids.

The school will consist of a series of 3-week short courses with 10 students per course period. It will operate on a 10-month basis.

Those enrolling for the course will be partially trained operators from natural-gasoline plant and other laboratories. They will be instructed in the finer points of analysis—particularly in the elimination of costly human errors.

Equipment to be used consists of a manually operated column, a semiautomatic and a fully automatic Hyd-Robot, all furnished by Podbielniak, Inc., Chicago. Studies also will be made using auxiliary equipment involving refractionation and vapor - phase "cut-point" determination and Orsat analysis.

Studies . . . Considerable time will be allotted to sampling methods for laboratory and manufacturing processes and field production. Other subjects to be covered include instrumentation, reagents, principles and theory of analysis, assembly and repair of equipment and its calibration and corrections.

Instructor will be S. T. Preston, now an assistant professor of petroleum engineering at the University of Texas. Preston is being retained by N.G.A.A. on an annual basis.

The idea for the school came out of the recently completed series of comparative analytical studies conducted by N.G.A.A. in which 76 oil companies and commercial laboratories analyzed identical hydrocarbon - liquid samples with a wide variety of results.

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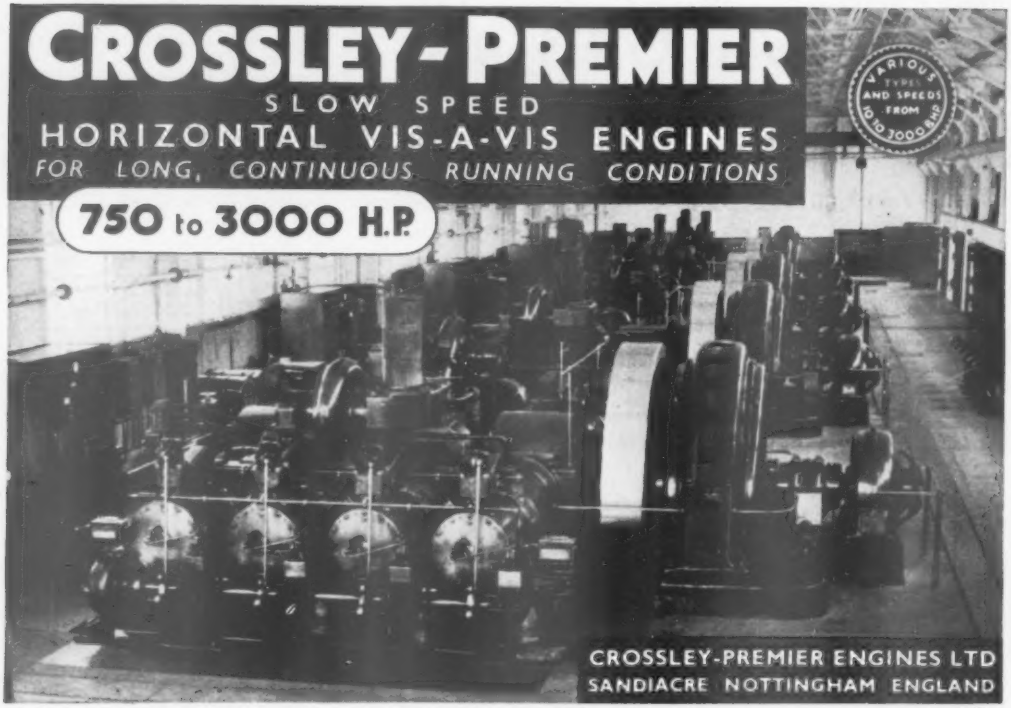

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REFINING

Evaporation Losses

A.P.I. to blanket subject at 1952 meet in Chicago

CHICAGO.—Costly and troublesome evaporation losses will get a lot of attention at the coming annual meeting here of the American Petroleum Institute in Chicago.

Three prepared papers together with discussions are slated for a full-scale symposium on that subject to be held Monday afternoon, November 10.

The session has been organized by a special committee appointed late last year. Three subcommittees were formed then to prepare papers on theory, losses from cone-roof tanks, and losses from conservation-type tanks. Each will be followed by prepared discussions.

J. H. McClintock of Esso Standard Oil Co., New York heads the parent evaporation-losses committee. H. C. Packard of Shell Oil Co., New York is chairman of the subcommittee on theory, with C. C. Ashley, Redwood City, Calif., consultant presenting the paper and O. W. Johnson of Standard Oil Co. of California the discussion on that subject.

The paper on cone-roof tanks will be given by I. L. Wissmiller of Chicago Bridge & Iron Co., with the discussion by S. S. Smith of Shell, New York. L. S. Wrightsman of Humble Oil & Refining Co. heads this subcommittee.

Chairman of the group on conservation-type tank losses is E. L. Hoffman, Socony-Vacuum Oil Co., Inc., New York. The paper will be given by H. L. O'Brien of Graver Tank & Manufacturing Co., East Chicago, and the discussion by A. B. Stevens, General Petroleum Corp., Los Angeles.

In addition to the subcommittee chairmen, the general committee membership consists of ten technical representatives of oil companies, whose combined effort will be to present in one session, the most complete coverage ever attempted on evaporation losses.

Cities Service Refinery in New Jersey To Be Dismantled

CAMDEN, N. J.—Cities Service Oil Co. (Pa.), has contracted with J. C. Berkwit & Co., of New York City, to dismantle the 8,000-bbl. refinery located at Pettys Island near here.

Towers, tower sections, exchangers, separators, strippers, pumps, motors, and controls will be salvaged, and the remaining equipment will be sold as scrap.

The Pettys Island plant is the third Cities Service installation to be scrapped recently. Berkwit recently completed dismantling the company's 15,000-bbl. skimming and asphalt plant at East Braintree, Mass., and a plant for the manufacture of 5-gal. cans at St. Rose, La.

Sinclair Building Propane De-resining Unit in New York

WELLSVILLE, N. Y.—Sinclair Refining Co. is contracting for the construction of a new propane de-resining unit at its 9,000-bbl. refinery here.

The plant, capable of processing 700 bbl. per day of heavy cylinder stock, will perform a dual purpose of removing heavy ends from high-quality Pennslyvania Grade lubricating oil and recovering three grades of heavy resins as specialty products.

Charging a 600° F. flash point, 300-viscosity feed stock, Sinclair will produce a finished, de-resined oil and will split the resins into light, intermediate, and heavy fractions.

By incorporating refrigeration, a new feature in this type of plant, they expect to recover a heavy resin with a viscosity of about 30,000 S.s.U. at 210°

Getting Acquainted

Dr. J. G. Davidson, president of Carbide & Carbon Chemicals Co., gets the lowdown on Torrance, Calif., from R. L. Minckler, president of General Petroleum Corp. Torrance is the newly chosen site for Carbide & Carbon's $36,000,000 polyethylene and ethylene glycol plant. The new plant will be located on 140 acres adjacent to General Petroleum's refinery at Torrance and will use some of the refinery's byproducts as raw materials under a 20-year contract signed by the two companies.

LUBRICATE PLUG VALVES 10 to 15 times FASTER

One Company saved over $10,000.00 in one year!

Reduces plug valve maintenance costs ⅓.

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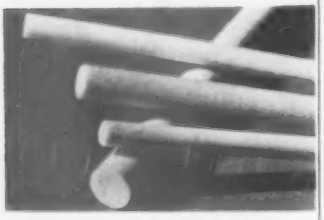
"TEFLON" SHEETS . . . Style E-2

Sheets are flat with edges sheared square. Tolerance on thickness is plus or minus .016". Available in wide range of thicknesses from 1/16" through 1".



"TEFLON" EXTRUDED RODS . . . Style E-5

These rods are round, smooth, straight, and free from internal cracks. Available in wide range of diameters from ⅛" through 4½".

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SPECIAL MOLDED SHAPES

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MOLDERS OF "TEFLON" SHAPES

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F. The unit can also be used on blocked operation, for the propane deasphalting of some Mid-Continent lube stocks which are processed separately in the refinery.

The Fluor Corp., Ltd., of Los Angeles, will design and build the new unit. Initial field work will commence this month and completion of the unit is anticipated by the spring of 1953.

The unit will cost an estimated $1,000,000. Of this cost, Sinclair has been granted certificates of rapid amortization covering 45 per cent of $32,000 and 65 per cent of $810,000.

The Sinclair unit will be the third of its kind to be built in the Pennsylvania Grade region. Kendall Refining Co. operates a similar 1,200 bbl. per day unit at Bradford, Pa., and Pennzoil Co. has a 1,370-bbl. unit operating at its Rouseville, Pa., refinery. Both refineries are extracting resins for specialty use as fillers, binders, chemical basics, and other purposes.

Lube Oils Play Major Role In Engine Wear, S.A.E. Told

SAN FRANCISCO. — Lubricating oil plays a very important role in internal wear of an engine, according to recent studies made by Ford Motor Co.

In a parer recently presented before the Society of Automotive Engineers' national West Coast meeting in San Francisco, R. J. Pocock reported on a series of engine and fleet tests.

Pocock pointed to the need for cleaner-burning fuels which would lessen the contaminant load and improve piston-ring operating conditions.

When cleaner fuels are available in quantity, he predicted, the need for such high concentrations of detergent additives in motor oil will disappear, so that more attentin can be directed to essential lubrication qualities.

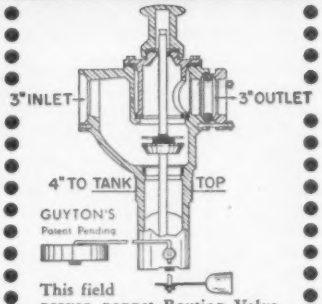
Frontier Oil Employing New Compressor Setup for Cat

TONAWANDA, N. Y.—Frontier Oil Refining Co.'s new 7,500-bbl.-a-day fluid catalytic cracker, now building here, will be equipped with Worthington Corp.'s first high-speed balanced-opposed compressors to be driven through gear-reduction sets by explosionproof motors.

According to Worthington, the balanced-opposed frame is so constructed that no inertia forces are transmitted to the foundations. The frames being built for Frontier also incorporate many features not available in earlier designs.

The cat cracker, of U. O. P. design, is being built by A. G. McKee & Co., Cleveland.

USED BY MANY MAJOR OIL COMPANIES
STOCK TANK ROUTING VALVE



This field proven poppet Routing Valve is now used as standard equipment by many major companies—Valve is set manually, and then switches flow from Tank to Tank, or by-passes a tank.) *Write for Complete information.*

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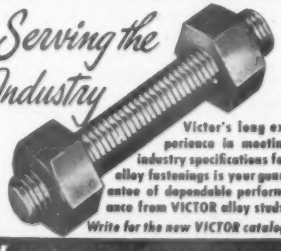

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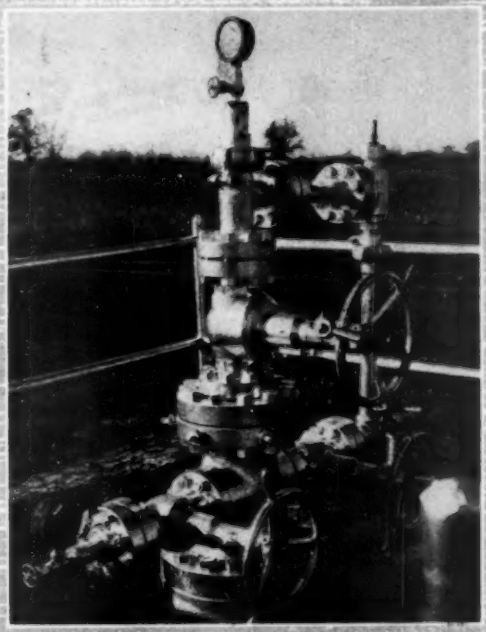

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All **Orbit Rising Stem Forged Steel Valves** utilize Plastic Stem Packing that is adjustable. This construction uses heavy duty multiple lip packing rings, opposed, at the top and bottom of the packing chamber and are held in contact with the valve stem by Plastic Packing, which not only exerts pressure on the packing rings but also is itself a lubricated packing.

This special packing arrangement permits the operator to make packing adjustments or add new packing if necessary while the valve is in service and under pressure.

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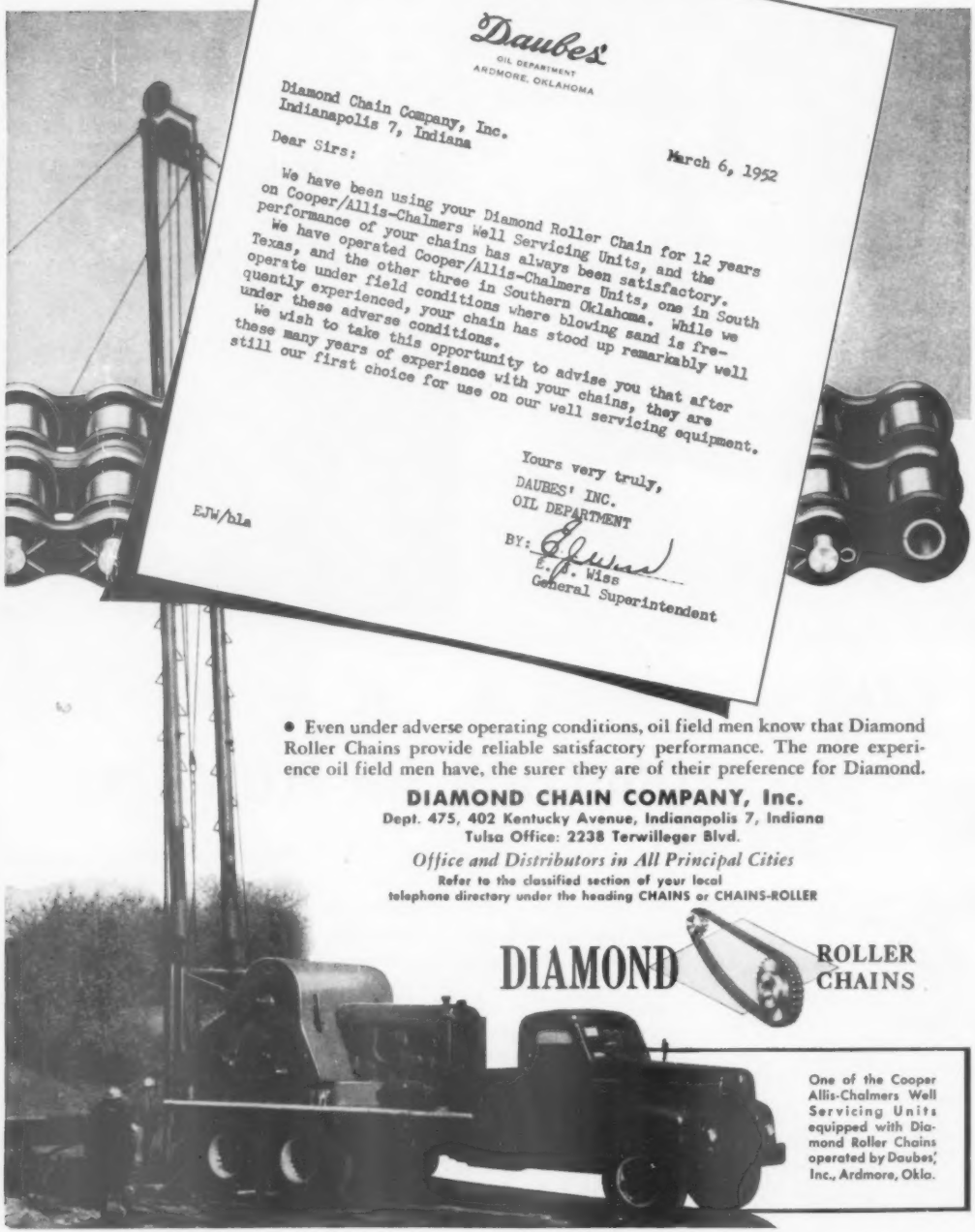

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We wish to take this opportunity to advise you that after these many years of experience with your chains, they are still our first choice for use on our well servicing equipment.

Yours very truly,
DAUBES' INC.
OIL DEPARTMENT
BY: E. J. Wiss
General Superintendent

EJW/bla

• Even under adverse operating conditions, oil field men know that Diamond Roller Chains provide reliable satisfactory performance. The more experience oil field men have, the surer they are of their preference for Diamond.

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Andrews County's Deep Discoveries

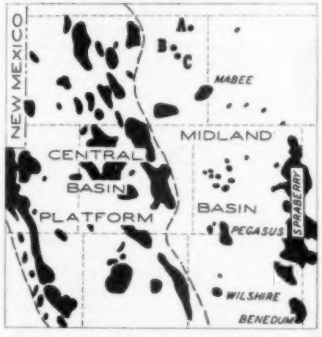
RECENT Devonian and Ordovician-Ellenburger discoveries in the northeastern part of Andrews County in West Texas have been significant additions to a lengthening "trend" of deep production up the western side of the Midland basin.

The developing trend roughly parallels the eastern edge of the Central Basin platform, apparently along a line of structures with enough closure to have trapped sufficient quantities of oil to make the deep, hard-rock drilling profitable. It runs from Wilshire-Ellenburger field in Upton County north through several recently completed or indicated pre-Permian discoveries to Pegasus multipay field; on north through the Parks area; and, now up into the northeastern portion of Andrews County where discovery wells are marked A, B, and C on sketch map. These Andrews County discoveries are in the deepest part of the Midland basin—the Ellenburger is topped at a depth of about 13,500 ft.

Exploratory interest in the trend has eased yet farther north. In adjacent Gaines County six seismic crews are now active. Andrews County, which saw a peak of 13 crews last May just prior to the University Lands sale, still has 4 active seismic crews.

There would undoubtedly be more seismic crews active in this trend area if it weren't for the tight lease situation. Vast areas of mineral fee rights are owned by a few major companies which bought them years ago. Tremendous leases are held by an insignificant number of shallow (Permian production) wells. It is virtually impossible for a newcomer to find open blocks of sufficient size to make geophysical surveying and deep wildcat drilling potentially profitable. Prices that must be paid for the small leases available are prohibitive. Quite a number of companies developed a sincere interest in this area only to back away after finding how little acreage they could pick up in comparison to the risks of capital involved.

Three Andrews County wells which have indicated the future potentialities



of this deep part of the Midland basin are:

1. Magnolia Petroleum Co. 1 University, C on sketch, discovery well of Magutex-Ellenburger field. This wildcat was completed in the Ellenburger from perforations at 13,840-84 ft. for 555 bbl. of 44°-gravity oil on ½-in. choke. The discovery also had flowing oil in the Devonian at 12,554-72 ft. It is the deepest producing oil well in Texas.

2. The Texas Co. 1-Z State, A on sketch, 7 miles to the northeast of Magutex. This wildcat drilled to a depth of 13,725 ft. in the Ellenburger which tested water. It was plugged back to 12,710 ft. and completed for a 24-hour flowing potential of 377 bbl. of 44°-gravity oil on a 32/64-in. choke with no water from perforations at 12,530-90 ft. in the Devonian. This discovery is about 6½ miles northwest of another Texas Co. discovery—on the Martin-Andrews county line is a well which produced some oil from the Ellenburger before being plugged back for completion in the Devonian to open Block 7 pool.

3. Phillips Petroleum Co. 1-CC University, B on sketch, 2½ miles northwest of Magutex. This was an old well drilled deeper which had originally been completed dry at 6,616 ft. On a 1-hour drill-stem test at 12,513-41 ft. in the Devonian the well flowed 69 bbl. of 44°-gravity oil. On another 1-hour test, also in the Devonian, at 12,541-91 ft. it flowed 32 bbl. of oil an hour. This wildcat is now drilling ahead to test the Ellenburger estimated to be topped at 13,500 ft.

That big structures in the deep rocks of the trough of the Midland basin offer future significant oil fields cannot be doubted. Here is an oil province with great potentialities, but a province reserved for big operators already established in the area. Its development will probably still be going on 25 years from now.

—Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

MONTANA . . . The Texas Co. has confirmed earlier success in the Northwest Sumatra area of Rosebud County with the 2 Grebe, C SW NE 15-11n-32e, which flowed at a 750-1,000-bbl. per day rate on early tests.

UTAH . . . Carter Oil Co. is continuing to test at a possible discovery in the Antelope area of Duchesne County. The well, in C SW SE 8-4s-3w, made mud-cut oil on initial tests.

NORTH DAKOTA . . . Amerada Petroleum Corp. is continuing to test 1 North Dakota "D," important Charlson area wildcat in McKenzie County, after reacidizing with 5,000 gal. in the interval 8,998-9,042 ft. Following treatment the well flowed 127 bbl. of oil and 131 of water per day on ½-in. choke.

PERMIAN BASIN . . . Phillips Petroleum Co. has completed 1 Glenna, Pecos County gas discovery, as the deepest producer in the basin. Magnolia Petroleum Co. 1-36991 University, ½-mile north extension to Magutex pool in Andrews County, developed 180 ft. of slightly oil and gas-cut mud on drill-stem test from 12,212-295 ft. and was drilling ahead at 12,337 ft.

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Permian Basin

Deepest Producer in Basin Completed

MIDLAND.—Phillips Petroleum Co. has completed its 1 Glenna, Pecos County gas discovery, as the deepest producer in the Permian basin. Gas gaged 12,260,000 cu. ft. daily on 1-in. choke, plus 3.8 bbl. of high-gravity distillate per day. Completion perforations in the Ellenburger were 13,700-13,835, 14,090-14,285, 14,400-60 ft., and open-hole between 14,485-14,522 ft., total depth. Flowing tubing pressure was 1,335 psi.

Previous deepest producer for the basin was Magnolia Petroleum Co. 1 University, northeast Andrews County, which produces from the Ellenburger at 13,840-84 ft.

Phillips 1-CC University, important Devonian discovery (or possible extension northwest to Magnolia 1 University), had not yet reached the Ellenburger at this report. This well was high on the Devonian to Magnolia's discovery, reaching that zone at 12,510 ft., minus 9,476 ft. Top of the Silurian was 12,630 ft., and operators were drilling below 12,965 ft.

Magnolia 1-36991 University, ½ mile north extension to Magnolia 1 University, (Magutex pool), developed 180 ft. of slightly oil and gas-cut mud on drill-stem test from 12,212-95 ft., and was drilling ahead at 12,337 ft. The test was run in the Mississippian limestone, topped at 12,055 ft. On that marker the well was reported 35 ft. high to the same zone in the discovery well.

In southeast Andrews County, Phillips 1-JJ University was drilling below 11,107 ft. Elevation is 3,264 ft.

Phillips 1-FF University, 15 miles southwest of Andrews and just east of the Embar field, was drilling limestone at 11,419 ft. Top of the Devonian was 10,548 ft.

In the northeast corner of Andrews, The Texas Co. 1-AB State, which had water in the Devonian but was showing for an Ellenburger well, developed water blanket and 90 ft. of drilling mud on a 1-hour test at 12,200-12,371 ft.

In Scurry County, The Texas Co. 1 Fuller, 62-5-H&GN, 18 miles northwest of Snyder, developed oil and gas-cut mud in the top of the Pennsylvanian from 7,552-80 ft., and had flowing oil on second test at 7,586-7,606 ft. On the latter test, oil reached the top in 12 minutes and gaged 42 bbl. of 39°-gravity oil in 1 hour. Open flowing bottom-hole pressure ranged from 525-1,650 psi. Operators ran casing to 7,606 ft. According to field sources, the well was to be perforated for completion attempt instead of drilling deeper.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCAT

Martin County: Tom D. Fowler 1 Tant Lindsey, 16-38-T1N-T&P, TD 4,330 ft., elev. 2,778 ft., pay 4,260 ft., IP pumped 8 bbl. 26°-gravity oil.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Andrews County: Gulf Oil Corp. 1-PPP, 17-9-University, TD 12,755 ft., elev. 3,192 ft., Devonian 10,588 ft., Ellenburger 12,655 ft.

Culberson County: Grisham Hunter Corp. 1 M. A. Grisham, 8-60-T5-T&P, TD 1,555 ft., elev. 3,723 ft., Delaware lime 1,360 ft. Magnolia Petroleum Co. 1-A Homer Cowden, 12-63-T2N-T&P, dry, TD 11,650 ft., elev. 3,917 ft., Pennsylvanian 7,250 ft., Mississippian 9,567 ft., Devonian 9,760

(Continued on page 176)

California

Total Drilling Behind Last Year's Pace

LOS ANGELES.—California wildcatting activity continued at what is probably a record high level but total drilling has fallen behind last year's pace. The decrease in development drilling, under way for the past 3 months, has been generally attributed to shortages of tubular goods.

According to the Division of Oil and Gas, notices to drill new wells totaled 1,620 for the week ending August 23. In the like period of 1951, 1,637 notices had been filed. Until mid-August this year's activity had exceeded that of a year ago at all times.

Of the 11 new exploratory tests filed with the division last week, or announced by the company, two important wildcats were for Los Angeles and one was near Orcutt in Santa Barbara County.

Universal Consolidated Oil Co. has applied to the Los Angeles City Planning Committee for authorization to drill a deep Miocene test on properties of 20th Century-Fox Film Corp. in old Beverly field. The company has 200 acres of studio property leased and 120 acres of Hillcrest Country Club. Directional drilling from a restricted island is planned.

Near Chatsworth in San Fernando Valley, Sunray Oil Corp. is to drill 72-15 Greenman Community in 15-2n-16w. The wildcat will be about ¾ mile northwest of a 6,058-ft. dry hole drilled by Petroleum Securities in 1927.

The Orcutt test will be the Los Nietos Co. 25-11 S.S.T. on a large block of acreage 2 miles north of Orcutt field. Drilled jointly with Western Gulf Oil Co., the test is an outgrowth of Union Oil Co.'s three recent Hartnell and Dome wildcats. Union, parent company of Los Nietos, reportedly has about 5,000 acres under lease around the new test and Western Gulf a like amount. Site of the test will be in NW 11-9n-34w.

Union 18 Dome, a deep test at Orcutt, has reached a depth below 9,350 ft. In 18-8n-34w its 3 Jesus Maria was below 2,500 ft. and in 3-8n-35w its 4 Jesus Maria had reached 3,893 ft. Still another Union wildcat in this area was 1 Rudolph in 20-8n-34w, drilling below 3,250 ft.

In the Ventucopa area on the southeast edge of Cuyama Valley, Ventura County, where it already has drilled three dry holes, Richfield Oil Corp. was preparing to start another test. Equipment was being moved in to drill 1 Dixon-B in NE NE 25-8n-24w.

Superior Oil Co. appeared to have a producer at the north offset to its recent Pliocene sand discovery northeast of Lost Hills production, San Joaquin Valley. Following a 1¾-hour formation test at 3,059-81 ft., 1,944 ft. of emulsified oil and no free water was recovered. The stepout, 2 Lost Hills-Government in 18-26s-21e, was being cored deeper at last reports. Universal Consolidated Oil Co. has started a south offset to the discovery and Tide Water Associated Oil Co. has staked a northwest offset in 13-26s-20e.

At Wheeler Ridge in southeast Joaquin Valley, Richfield Oil Corp. completed the southwest offset to its Eocene sand discovery for a 1,900-bbl. producer. Flow was through a 24/64-in. choke in 142 ft. of sand between 10,060 and 10,202 ft. Bottomed at the latter depth, the well was still in oil sand.

CALIFORNIA SUCCESSFUL WILDCAT

Sutter County, new field discovery 2 miles southeast of Marysville-Buttes field: Richfield Oil Corp. 1 Sutter Comm. A, NW SW 8-15n-2e, flowed 9,000 M.c.f. per day through perforations at 2,065-2,145 ft., TD 3,104 ft., elev. 66 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Devils Den area: Honolulu Oil Corp. 1 Honolulu-Gilliland & Davis-Delhi-S. F. & F. L., 10-25s-18e, dry, Point of Rocks 2,895 ft., TD 2,972 ft., elev. 598 ft.

Monterey County, San Ardo area: Standard Oil Co. D-6-3 Alexander, 3-23s-11e, dry, Lombardi 2,670 ft., basement 2,928 ft., TD 2,938 ft., elev. 1,206 ft.

San Luis Obispo County, Creston area: Amerada Petroleum Corp. 1 McWilliams, 32-27s-13e, dry, TD 2,180 ft., elev. 1,158 ft.

Sutter County, Princeton area: H. H. Magee, Oper. 4 Brady, 33-17n-1e, dry, TD 2,504 ft., elev. 65 ft.

Tulare County, Lindsay area: King Development Co. 1 A.K., 12-20s-26e, dry, TD 1,071 ft., elev. 363 ft.

Eastern Texas

Extension Completed on West Side of Long Lake

DALLAS.—The west side of Long Lake field in southwest Anderson County gained a new oil well and extension at Haynes B. Ownby Drilling Co. 1 Virginia Scott. Completion gage through 9/64-in. choke was 69 bbl. of 42°-gravity oil a day from perforations between 5,272-80 ft. Flowing pressure was 968 psi.

Work was to start immediately at B. F. Phillips, Jr., 1 J. H. McKnight, Woodbine exploration 2 miles south of Pine Mills in Wood County. Kurt Coulston Drilling Co. of Gladewater had contract to dig the 7,000-ft. test. Location on a 1,395-acre tract in the James M. Candler Survey, A-102, is approximately 1 mile west of sub-Clarksville production in Shirley-Barbara field.

Ace Oil Co. has staked location for 1 W. G. Highnote, 3 miles southeast of Winnsboro in northern Wood County. Projected depth of 6,700 ft. is expected to penetrate the Paluxy. Location in the P. L. Smith Survey is southwest of W. A. Byrd 1 Eva Mills, dry sub-Clarksville wildcat to 4,185 ft.

Pure Oil Co. 8-D Swain, northeast of Van in Van Zandt County, was running electrical surveys to total depth at 7,083 ft. Drill-stem test of the Travis Peak at 6,356-6,433 ft., open 2 hours, recovered 390 ft. of slightly gas-cut salt water, and 4,993 ft. of salt water.

In Cherokee County, Frank and George Frankel 1 House, southwest of Ironton, was dry at 9,419 ft., with no shows reported.

EAST TEXAS (DISTRICTS 5 AND 6) SUCCESSFUL WILDCAT

Harrison County: British American Oil Production Co. 1 Webb Rogers, J. C. Walling Sur., 4 mi. SE Scottsville, TD 6,558 ft., elev. 298 ft., perforated Young zone of Rodessa 5,413-17 ft., IP 26,000,000 cu. ft. gas, plus 20 bbl. distillate per 1,000,000 cu. ft. of gas; perforated Byrd zone of Rodessa 5,938-58 ft., IP 28,000,000 cu. ft. gas, plus 17 bbl. distillate per 1,000,000 cu. ft.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Collin County: Deep Rock Oil Corp. 1 W. M. Sherley, D. Van Winkle Sur., dry, TD 8,887 ft.

Fannin County: Henderson Drilling Co. 1 J. C. Parks, Wm. O'Brien Sur., dry, TD

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2,590 ft., elev. 548 ft., Goodland 1,020 ft., Paluxy 1,030 ft.

Hill County: H. E. Harper 1 D. L. Fussell, Hiram Estes Sur., dry, TD 1,251 ft.

Lamar County: Dail Goodson 1 Paris News, A. N. Askins Sur., dry, TD 2,710 ft.

Limestone County: Kennon & Smith 1 J. G. Phillips, R. Scott Sur., dry, TD 2,780 ft.

Wood County: W. A. Byrd 1 Eva Mills, F. L. Smith Sur., A-522, dry, TD 4,815 ft.

North-Central Texas

Exceptional New Pay Due Throckmorton

WICHITA FALLS.—Throckmorton County had prospects of an exceptional producer, in a new pay zone, at Andrew H. Housley 1 J. B. Herrington, pool well in Section 903, TE&L Survey.

Howsley and associates had taken the well over to drill deeper and recomplete in the Mississippian limestone when it blew out around 4,426 ft. At that depth it was thought to be in the Ranger sand, previously nonproductive in southeastern Throckmorton County. The well flowed out of control for 18 hours at a rate estimated up to 400 bbl. of oil an hour. At last report the flow had been killed and it was drilling ahead.

Southwest of Throckmorton, Pan American Production Co. 1 J. B. Matthews recovered 1,240 ft. of gas, 95 ft. of salty mud and 240 ft. of mud-cut salt water on drill-stem test from 4,325-38 ft.

Clay County reported a good extension well at L. T. Burns 1 I. M. Hilburn, J. Robbins Survey, A-394. The well was completed on the pump for a daily potential of 481 bbl. of 41°-gravity oil a day. Strawn pay was found from 3,015-25 ft. Location 3 miles west of Shannon is 1 mile southwest of a new Strawn sand area.

In Montague County, Luke Grace Drilling Co. 1 Mrs. M. Mitchell, wildcat in 87-5 Chas. Lockhart Survey, was drilling shale and sand at 5,376 ft.

Mid-Continent Petroleum Corp. 1 Loyd Orrell, wildcat 2 miles northwest of Forestburg, was in shale and saandy lime at 5,095 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: Reno Oil Co. 1 Minton, Blk. 86, ATNCL, TD 3,997 ft., elev. 991 ft., pay 3,979 ft., IP pumped 151 bbl. 42°-gravity oil, GOR 425 cu. ft.

Coleman County: H. A. Bridwell & Son 1 J. F. Casey, 657-4-H. Crocheron Sur., TD 1,651 ft., pay 1,641 ft., IP pumped 44 bbl. 43°-gravity oil.

Eastland County: Ray C. Liversay 2 S. L. Moore, L. T. Vann Sur., TD 3,067 ft., elev. 1,430 ft., pay 3,038 ft., IP pumped 8.3 bbl. 40°-gravity oil.

Jack County: F. Kirk Johnson 1 T. D. Williams, BBB&C Sur., A-91, TD 4,873 ft., elev. 1,046 ft., upper Strawn sand pay 2,141 ft., IP pumped 69.6 bbl. 42°-gravity oil.

Jones County: Robinson-Puckett 1 I. J. Allen, 41-1-BBB&C, TD 2,452 ft., elev. 1,661 ft., pay 2,440 ft., IP pumped 64 bbl. 42°-gravity oil.

Ungren & Frazier 1 Jane Hoyt, 20-15-T&P, TD 2,217 ft., pay 2,204 ft., IP pumped 69.7 bbl. oil.

Knox County: Deep Rock Oil Co. 1 J. C. Hawkins, 43-2-D&W, TD 6,095 ft., elev. 1,535 ft., pay 5,775 ft., IP pumped 150 bbl. 50°-gravity oil.

Shackelford County: Roser & Pendleton, Inc. 1 Dell Newell, 9-12-T&P, TD 4,968 ft., pay 4,944 ft., IP 92 bbl. 39°-gravity oil, ¾-in. choke, TP 125 psi., GOR 500 cu. ft.

Stephens County: C. C. Grantham 2 Whittenburg, J. Finley Sur., A-2,088, TD 3,259 ft., elev. 1,251 ft., pay 3,255 ft., IP 120 bbl. 40°-gravity oil, TP 50 psi., GOR cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Drilling & Production Co. 1 Fannie Byrd, M. Probert Sur., A-337, dry, TD 1,458 ft.

Concho Petroleum Co. 1 Johnie Griffin, 9-4-H&TC, dry, TD 4,360 ft., elev. 119

(Continued on page 176)

Louisiana-Ark.

Production Tests Due At Bossier Discovery

SHREVEPORT.—Carter Oil Co. has set pipe in their prospective Bossier Parish gas-condensate discovery. The indicated strike, 1 Crystal, SW NE 33-21n-11w, lies 2⅝ miles southeast of Ivan townsite.

The Taylor sand was indicated from 9,702-17 ft. by log. Recovery on a drill-stem test taken from 9,702-16 ft. was 36 ft. condensate, 1,080 ft. condensate and water cushion and 120 ft. water and mud-cut with condensate, using ¼-in. top choke and ⅜-in. bottom choke plus 2,000-ft. water cushion with tool open 2½ hours.

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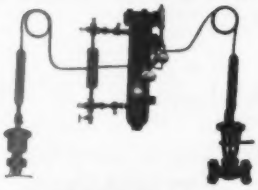

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perforate for production tests at 2 Hogue-Esperance, Section 8-5n-9e, Concordia Parish. The well is located 1 mile southwest of the discovery well of Esperance Point field. Operators will perforate for production between 8,365-75 ft., apparently in the Campbell sand interval of the Wilcox. Recovery on a 10-minute drill-stem test of the interval 6,372-86 ft. was 270 ft. of oil and 780 ft. salt water, using ¼-in. chokes.

LOUISIANA WILDCAT FAILURES

Claiborne Parish: T. L. James & Co. 2 Gray, 790 ft. S and 365 ft. W NEc SE 20-22n-5w, dry, TD 3,194 ft.

Morehouse Parish: Carter Oil Co. 1 Hope Fee "B," C NE SE 34-21n-8e, dry, TD 3,010 ft.

ARKANSAS WILDCAT FAILURE

Calhoun County: Alcan Oil Co. 2 Calion Lumber Co., 660 ft. S and 710 ft. E NWc 22-15s-14w, dry, TD 2,800 ft.

Texas Gulf Coast

Production String Set At Harris Prospect

HOUSTON.—Tennessee Production Co. has cemented 5½-in. production string in 1 Percy Holt, apparent discovery in Harris County, approximately 3 miles east of Huffsmith and 4 miles northeast of Tomball field. Operator made hole to 7,702 ft. and plugged back to 6,856 ft. prior to cementing casing at 5,880 ft. 2 drill-stem tests 5,822-27 ft. and 5,827-32 ft. were previously reported to indicate the opening of a new oil reservoir. First test at 5,822-27 ft., flowed pipe line oil under 60 psi., no gage, with tool open 18 minutes. Second test with packer at 5,824 ft., ¼ by 11/64-in. chokes, showed recovery of 5,300 ft. of 35°-gravity oil, no water with tool open 35 minutes. Final bottom-hole flowing pressure registered 2,125 psi. Operations is on the J. Donnelly Survey, A-223.

Seven miles southwest of Anahauc in Chambers County, The Texas Co. has recovered 33.2°-gravity oil on drill-stem test in 2 State Tract 9-12-C, 10,000-ft. outpost 3,000 ft. northeast of Fishers Reef production. On drill-stem test at 9,863-67 ft., ¼-in. chokes, 2,460 ft. of water cushion, recovery was water cushion cut with gas and 30 bbl. of oil, no water. Test developed maximum working pressure at the surface of 12 psi. and flowed with bottom-hole flowing pressure 3,440-3,715 psi., and developed shut-in pressure of 3,970 psi. in 5 minutes. Location is on the Trinity Bay.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Calhoun County: Southern Minerals Corp. A-1 W. L. Traylor, Phillip Dimmitt Sur., dry, TD 8,982 ft.

Sun Oil Co. 2-43 Lavaca Bay St. Tr. 43, Lavaca Bay Subd., dry, TD 9,067 ft.

Sun Oil Co. 2-43 Lavaca Bay St. Tr. 43, Lavaca Bay Subd., dry, TD 3,760 ft.

Brazoria County: J. M. Flaitz & R. B. Mitchell 1 Houston Bank & Trust Co., Johnson, Walker & Border Sur., A-77, dry, TD 9,301 ft.

Fort Bend County: J. D. Cain 1 J. C. Pasteka, H&TC RR Co. Sur. 72, dry, TD 6,345 ft.

Goliad County: Magnolia Petroleum Co. 1 R. L. Pettus, J. Callahan Sur., A-91, dry, TD 3,600 ft.

Karnes County: Tennessee Prod. Co. 1 Paul A. Seidel, Jr., John Adriance Sur., dry, TD 7,750 ft.

Lavaca County: Rycade Oil Corp. 1 R. F.

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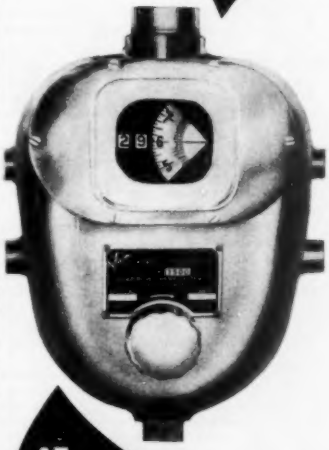

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Schoolfield et al, Jac. F. McLaurine Sur., dry, TD 9,022 ft.

Orange County: Pan American Prod. Co. 1 M. P. Kerr, A. McIver Sur., dry, TD 8,700 ft.

Refugio County: Lamar Hunt Tr. Est. 1 E. V. Wright, Geo. Maury Sur., dry, TD 8,957 ft.

Victoria County: E. F. Lingle & W. A. Steinmann 1 W. A. Wagner, T&NO RR Co., dry, TD 2,513 ft.

Wharton County: Brazos Oil & Gas Co. A-1 Thelma Weinheimer, Wm. Ness Sur., dry, TD 5,515 ft.

Southwest Texas

Gas-Distillate Tested At Hidalgo Confirmation

CORPUS CHRISTI.—Houston Oil Co. and American Republics Corp. 3 Temple W. West et al, Tabasco area, confirmation test in Hidalgo County, has tested gas-distillate from Hockleyensis zone on drill-stem test. Test was from 5,992-6,002 ft. On ¼-in. chokes, well had 1,200 psi. maximum working pressure, bottom-hole pressure of 2,650-2,850 psi. Recovery was 12 ft. of 52°-gravity distillate and 12 ft. of rathole mud. Operators are now drilling below 6,150 ft. with mud logging unit on well. Location is 4½ miles northeast of Sam Fordyce.

Renwar Oil Corp. 1 Marion Hearn, new pay discovery in Turkey Creek extension area of Nueces County, has been gaged at 8,000,000 cu. ft. of gas per day on open flow. Production is from perforations 5,320-27 ft. Gas liquid ratio was 91,000-1 with 53° gravity. Drill site is on BS&F Survey 420, A-857, 10 miles northwest of Corpus Christi.

Phillips Petroleum Co. A-1 Clara Driscoll estate in Nueces County has made two unsuccessful attempts to produce. First try was made on drill-stem test from perforations 8,352-57 ft. which recovered salt water. Operator set retainer at 8,330 ft. and reperforated 7,145-48 ft. Recovery on ¼-in. choke was 90 ft. of gas-cut mud, 90 ft. of oil-cut mud, and 6,660 ft. of salt water on 1 hour and 25 minute test. Both sets of perforations were squeezed and operators are preparing to perforate for another test. Well is located on the E. Villareal and W. S. McGregor Surveys 582 and 583.

A drill-stem test of the Hankamer Investment Co. 1 W. T. Hurt, Atascosa County wildcat, recovered 750 ft. of oil with ¼-in. choke, to indicate an extension to Fashing-Weigang field. Test was taken at 3,773-79 ft., and tool was open 18 minutes. Operator ran log at 3,779 ft., and 5½-in. casing was set at 3,771 ft. On open-hole test at 3,771-79 ft., well produced at the rate of 4 bbl. of 22°-gravity oil per hour. At the present, further tests are being made for completion of the well. Discovery is on the Kindallis Bryan Survey, A-69.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Kenedy County: LaGloria Corp. et al A-3 Kenedy Ranch, Rincon del Penasoal Grant, A-70, TD 8,000 ft., IP open flow 19,000,000 cu. ft. of gas per day, 18/64-in. choke.

Starr County: Sun Oil Co. 2 Vincenta L. de Pena, Santa Teresa Grant, TD 7,330 ft., IP 2,000,000 cu. ft. of gas per day open flow, prod. zone Vicksburg.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Aransas County: Hunt Oil Co. 1 State Tract 93 Aransas Bay Tract 93, dry, TD 9,571 ft.

Bastrop County: S. D. Rorem 1 W. R. Hess, H. P. Redfield Sur., A-286, dry, TD 2,252 ft.

Bell County: Pryor Dillard 1-A Vera Vaughn, M. Hunt, Sur., dry, TD 1,820 ft.

Pryor Dillard 1 William Z. Zabeik, Thornton Stone Sur., dry, TD 1,117 ft.

Bexar County: J. D. Bogle et al 1 Clark Kempshall, H. Nix Sur., dry, TD 2,468 ft.

Hyman Bros. 1 Hyman Fee, San Antonio Sub. Irr. Farms, dry, TD 2,041 ft.

Mac Donna Dev. Co., Inc. 2 Berry Packing Co., San Antonio Sub. Irr. Farms, dry, TD 1,158 ft.

Mac Donna Dev. Co., Inc. 1 W. C. Frazier, San Antonio Sub. Irr. Farms, dry, TD 1,188 ft.

Caldwell County: E. L. Bass et al 1 Ethel Cast, BAM Thomas Sur., dry, TD 2,758 ft.

BBC Oil Royalty Co. 1 J. R. Bellamy et al, Arthur Swift Sur., dry, TD 2,750 ft.

Duval County: Don H. Marsh 1-B Delores Garcia, Santa Crus de Conception Grant, dry, TD 4,410 ft.

Pontiac Refining Co. 1 Miller Ranch, Kiego Ynojosa Grant, A-629, dry, TD 6,013 ft.

Frio County: Kirkwood & Morgan, Inc. 1 A. H. McLean, Lim & Co., Co. Sur., dry, TD 5,236 ft.

Hidalgo County: The Chicago Corp. 1 W. R. Jackson, 3.5 miles north of Sullivan City, dry, TD 5,015 ft.

Webb County: Harold K. Boysen 1 Wilmot Est., 2 miles SW of Billings field, dry, TD 2,401 ft.

Harry E. Murray et al 1-A Daniel Adami, 25 miles NW Freer, dry, TD 1,555 ft.

Zapta County: J. C. McCabe et al 1 Cuellar Hrs., 9 miles NW Escobas, dry, TD 5,909 ft.

Mississippi

Pearl River Test Driling Ahead

JACKSON.—In Pearl River County, Gulf Refining Co. 1 U.S.A. "W" cut a series of eight cores from 9,509-9,619 ft. with recovery being mostly grey shale and sand with no shows except in cores 9,515-9,520 ft. which recovered 1 ft. of grey sand with spotted fluorescence and slight dead oil cut and in core 9,539-9,549 ft. with recovery being 1 ft. 10 in. of tan to grey sand with good fluorescence and cut. Operator did not run drill-stem test on these slight shows, however, and well is currently being drilled ahead below 10,105 ft.

In Adams County, Mississippi, the two recently completed Wilcox discoveries by John S. Callon of Natchez have been given field names. The Nomenclature Committee of the Mississippi Geological Society has adopted the name Jeanette field for the 1 R. L. Emery, Jr., Sec. 35-6n-1w. The second discovery, 1 James W. Vaught, Sec. 1-5n-1w, has been given the name Locust Hill field, taken from the plantation of the same name.

In the northeastern part of Monroe County, Mississippi, Union Producing Co. has abandoned its second test, 1 Watson, Sec. 31-15w, 7e, after a series of drill-stem tests. This well was shot with nitro twice without favorable results. The 1 Watson was cored solidly from 2,801 ft. to 6,732 ft. total depth. It is understood that all detail information on this well will shortly be released by Union Producing Co. at the well site.

MISSISSIPPI WILDCAT FAILURES

Franklin County: B. Serio-F. H. Shortridge 1 C. E. Thompson, Sec. 22-5n-1e, dry, TD 7,000 ft.

Holmes County: J. E. Treadway-D. C. Latimer 1 Unger Darnell unit, Sec. 6-15n-1e, dry, TD 5,500 ft.

Wilkinson County: Gulf Refining Co. 9 Crosby Lumber Co., Sec. 33-3n-1w, dry, TD 7,650 ft.

Oklahoma

Deep Caddo County Test Logs Oil and Gas Shows

PROMISING oil and gas showings have been encountered in a deep, rank wildcat test being drilled by Continental Oil Co. in western Caddo County, in the southwestern part of the state. The test, 1 L. V. Smith, in the C SE NW 32-10n-12w, now drilling ahead toward its original objective of 13,500 ft., logged showings in a sand zone at 9,192-9,283 ft. A 3-hour drill-stem test in that interval got a gas flow estimated at 100,000 cu. ft. per day and recovered 450 ft. of oil-cut mud. Flowing pressure ranged from 1,535 to 1,895 psi. Shut-in pressure gaged 3,490 psi. in 20 minutes. Location is 3 miles east of the Eakly community.

Shell Oil Co. 1 Rose, a wildcat located north of the old Robberson field, east of Royal, in Garvin County, flowed oil at the rate of 23 bbl. per hour during a drill-stem test in a sand at 3,663-3,710 ft. Tester was open 85 minutes, getting gas in 4 minutes and oil in 56 minutes. Gas flow was estimated at 215,000 cu. ft. per day. Flow pressure gaged 400 psi. and bottom-hole pressure 1,575 psi. A previous test slightly higher in the sand at 3,649-61 ft. recovered 1,140 ft. of oil. Gravity was 31.5°. Showings have been passed up for the time being. Hole is scheduled to be carried to 8,000 ft. Location is in the SE NE SW 6-1n-3w.

Indian Royalty Co. has an indicated Mississippi lime gas discovery in northwestern Garfield County where its 1 Daykin, SW SW SW 26-24n-7w, recovered 1,290 ft. of heavily gas-cut mud in a drill-stem test in that formation at 6,040-6,143 ft. Operators have run casing and are preparing to test the possible pay zone after having drilled to the Wilcox and finding that formation dry. Total depth in the Wilcox was 6,937 ft. Hole has been plugged to 6,200 ft. Top of the Mississippian was logged at 5,976 ft. Location is approximately 7 miles north and a little west of Enid and about 8 miles from nearest production of any kind.

In northeastern Garfield County, Carter Oil Co. is preparing to test good oil and gas showings which were encountered last month in its 1 Hoover, in the SW SW SW 20-24n-4w. In the meantime, the hole has been deepened to the Wilcox without further indications of commercial production. A 20-minute drill-stem test at 6,158-65 ft. in the Misener, topped at 6,155 ft., flowed oil at the rate of 20 bbl. per hour with gas at the rate of 1,000,000 cu. ft. per day. Total depth in the Wilcox is 6,344 ft. with bottom of the casing at 6,334 ft. Location is 3 miles south of Hunter and 2 miles northeast of the Southwest Hunter field. The test is on a unitized block, participated in by The Texas Co. and Atlantic Refining Co., in addition to Carter.

Another Misener sand discovery is in prospect in northwestern Lincoln County where K. A. Ellison got a gas flow estimated at 400,000 cu. ft. per day and an oil flow estimated at 5 bbl. per hour in a drill-stem test

in that sand in his 1 School Land, SW SE SW 16-16n-2e. Top of the Misener was logged at 4,839 ft. Interval tested was at 3,840-50 ft. Gas was at the surface in 4 minutes and oil in 28 minutes. Tester was open only 35 minutes. Bottom-hole flowing pressure was 425 psi. Total depth is 4,851 ft. with oil string run to 4,842 ft. Location is 2 miles east of Merrick.

Gulf Coast Western Oil Co. is opening a new pay zone and extending production a 40-acre location east for the Beaver field, 4 miles west of Marlow, in northwestern Stephens County. The well, 1 Tit-Tah, SW SW NW 3-2n-8w, swabbed and flowed at the rate of 30 bbl. of oil per hour while testing the upper Cisco zone, opposite which casing is perforated at 6,622-56 ft. and 6,670-80 ft. The well also is a potential producer in sands at 7,326-60 ft. and 7,552-7,600 ft., which also produce in the field.

Arrow Drilling Co. has an indicated Mississippi lime oil discovery at its 1 Patterson, in the NW SE NW 30-22n-1e, central Noble County, in the northern part of the state. The well filled 200 ft. of clean oil and 205 ft. of heavily oil-cut mud in a drill-stem test at 4,764-75 ft. (total depth). Top of the section was logged at 4,668 ft. Oil-string has been run for completion. Location is 2½ miles southwest of the Otoe City pool, which produces from the Layton sand.

OKLAHOMA WILDCAT FAILURES

Beaver County: Kidd Williams 1 Franz, C NE NW 8-5n-21ecm, dry, TD 7,026 ft.

Comanche County: J. M. Creel 1 Clanten, NW NW NW NW 2-1n-11w, dry, TD 945 ft.

Creek County: Amerada Petroleum Corp. 1 Gregg, NW NW NE 36-16n-7e, dry, TD 3,835 ft.

Arrow Drilling Co. 1 Stewart, SE SE NE 32-19n-8e, dry, TD 2,818 ft.

Jefferson County: Goff-Leeper Drilling Co. 1 Humphries, NE NE SE 23-4s-6w, dry, TD 4,920 ft.

Kay County: Jones & Shelburne 1 Snodgrass, NE NE SW 4-26n-3e, dry, TD 3,802 ft. Manahan Oil Co. 1 Mayer, NW NW SE 11-26n-1e, dry, TD 4,117 ft.

Lincoln County: Harry J. Schafer 1 Peace, SW SW NE 9-12n-4e, dry, TD 5,310 ft.

Love County: J. W. Baldwin 1 Goddard, NW SW NW 17-6s-2e, dry, TD 3,782 ft.

Pontotoc County: E. W. Mudge, Jr. 1 Phillips, SE NW SW 25-4n-4e, dry, TD 1,687 ft. J. Marvin Boyd 1 Bumpers, NW NW SE 32-4n-5e, dry, TD 2,082 ft.

Pottawatomie County: Smith Petroleum Co. et al 1 Chew et al, NE NW SE 17-11n-6e, dry, TD 4,706 ft.

South Louisiana

Final Gage Given at St. Martin Discovery

NEW ORLEANS.—Two miles south of Lake Mangoulis field production, Humble Oil & Refining Co. has reported a final gage of 281 bbl. of 36.7°-gravity oil plus 162,000 cu. ft. of gas daily on a 8/64-in. choke at the 1 Mrs. W. H. Crowson. New St. Martin Parish discovery bottomed at 13,462 ft., 9⅝-in. casing set at total depth and 2⅞-in. tubing swung at 10,645 ft., flowed through perforations at 10,691-696 ft. Tubing pressure was 1,450 psi., gas-oil ratio 576:1, and 0.4 per cent water was found in the test. Location is in Section 26-10s-9e.

On a 24-hour gage, Magnolia Petroleum Co. reported a flow of 76 bbl. of oil daily plus 26 bbl. of basic sediment and water on a 8/64-in. choke at its 1 Long Bell "E," Beauregard Parish wildcat. On a previous 16-hour test the well flowed at the rate of 52 bbl. of oil daily plus 16 bbl. of basic sediment and water. Originally drilled to 9,296 ft. well is bottomed at 8,597 ft. in sidetracked hole with 5½-in. casing set at 9,295 ft. Flowing through perforations at 8,590-94 ft., test registered 2,200 psi., tubing pressure, gas-oil ratio 8,080:1, and gravity 47.9° Location of well is 4 miles northwest of Fulton in Section 10-6s-9w.

Roeser & Pendleton is reported waiting on orders after a flow of 108 per cent salt water on drill-stem test at the 1 Slaughter, wildcat in Iberville, Parish. Tested on ¼-in. by ⅛-in. chokes, under working pressure of 4 psi., the well flowed through perforations at 10,799-783 ft. Bottomed at 11,145 ft., test has 5-in. casing set at 10,998 ft. Well is located in Sec. 28-9s-13e.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Calcasieu Parish: Sun Oil Co. 5 Lutcher-Moore, Sec. 2-8s-13w, TD 9,722 ft., IPF 145 bbl. of oil per day, 1,465,000 cu. ft. of gas per day, 50.6° gravity, gas-oil ratio 10,103:1.

SOUTH LOUISIANA WILDCAT FAILURES

Acadia Parish: Bates & Cornell 1 F. N. Hayes Est., Sec. 2-8s-1w, dry, TD 9,905 ft.

Beauregard Parish: Atlantic Refining Co. 1 Newport Ind., Inc., Sec. 30-5s-11w, dry, TD 10,600 ft.

St. Martin Parish: Atlantic Refining Co. 1 St. Lse. 1719, Sec. 11-15s-13e, dry, TD 13,500 ft.

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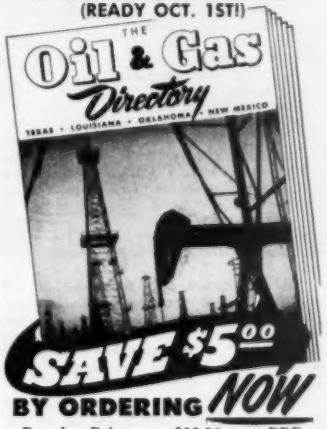

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Rocky Mountain

Northwest Sumatra Amsden Discovery Confirmed

DENVER.—Reports from Billings, Mont., indicate that The Texas Co.'s recent lower Amsden discovery in the Northwest Sumatra area of Rosebud County, has been confirmed by a second producer which showed for a gage more than twice that of the pool opener on early tests. The well, 2 Grebe, C SW NE 15-11n-32e, flowed at a daily rate of 750-1,000 bbl. in 20 minutes flowing time on drill-stem test of the interval 4,708-46 ft. Oil is 35.5° gravity. Gas flowed at the surface after 6 minutes, and oil after 56 minutes, with flowing pressure 1,460 psi. Shut-in pressure was 1,890 psi.

The new producer is ½ mile southeast of the company's 1 Grebe, C NW NW 15-11n-32e, which was completed for a potential of 283 bbl. per day. The apparent new pool is approximately halfway between Sumatra and Ragged Point fields, in an area where Texaco has done considerable exploration. Previous completions in this portion of Central Montana have been for potentials markedly smaller than that of the 1 Grebe, and much smaller than the indicated production from the confirmation success.

The Grebe discovery was the first potentially major development in Montana in recent months outside the Williston basin portion of the state, and the possibility of a significant pool is enhanced by test of the 2 Grebe.

Texaco is also testing at the apparent new pool opener, 1 NP "G" (NCT 4), C SW SW 23-17n-52e, in the Cedar Creek area of Dawson County. The wildcat, 14 miles north of the Cedar Creek discovery showed for production several weeks ago with a recovery of 2,880 ft. of clean oil on test of the zone 10,004 to 10,100 ft. Casing was perforated from 9,908-48 and 9,960-10,010 ft., and the formation acidized with 2,500 gal.

The well flowed at a daily rate of 125 bbl. from upper perforations, and a later test indicated a daily potential of 400 bbl. Both tests were of 5-hour duration, and the 400 bbl. per day gage was cut 2 to 4 per cent basic sediment and water. Top of Red River was logged at 9,417 ft.

In McCone County, Montana, Shell Oil Co. is drilling below 7,046 ft. and the 44-23-E NP, C SE SE 23-23n-49e, wildcat 1½ miles southwest of the Richey area discovery after recovery of 5.6 bbl. of oily mud, 50 per cent oil, 39.9 bbl. of oil, cut 10 per cent, and 3.7 bbl. of salt water on drill-stem test of the interval 6,970-7,005 ft. Tool was open 2½ hours with flowing pressure of 1,200 psi. The well is another apparent discovery along the successful northeast-southwest trend centered on the Richey pool opener.

In northeastern Montana Union Oil Co. of California has reported first shows in the current drilling campaign in the huge untested area west of North Dakota's Beaver Lodge, and south of recent shows in Canada. Union's wildcat, 1 Nuhring, C NW NE 32-35-47e, only drilling well in Daniels County, recovered 90 ft. of slightly gas-cut mud on 70-minute test of the interval 3,800-4,015 ft. Sheridan, Daniels, eastern Roosevelt counties in Montana, and Divide County in North Dakota were highly active from a leasing standpoint following the recent shows in Canadian Williston basin prospect just a few miles north of the Montana-North Dakota corner.

Three-quarters of a mile west of previous production in Beaver Lodge field, North Dakota, Amerada Petroleum Corp. has tested 1 N. Nelson, C SW SW 2-155n-96w, for a flow of 84 bbl. per hour. The well, most westerly success in the field to date, produced from the zone 8,330-75 ft. Gage on second hour of testing was 72 bbl., on third hour, 77 bbl.

Utah, which has not had a 1952 wildcat success, had shows in at least two prospects which indicated possibilities of commercial production this week.

Carter Oil Co. 1 Moon, C SW SE 8-4s-3w, in the Antelope area of eastern Duchesne County made gas at the surface in 25 minutes, recovered 45 ft. of 60 per cent oil and 40 per cent mud, and 360 ft. of 95 per cent oil and 5 per cent mud in 2 hours from 6,514-6,610 ft. Total depth on the possible discovery is 6,873 ft. and Carter is continuing tests. Carter has also recovered gas-cut mud on drill-stem test of the 1 Canyon-Government, SW NE 13-12s-14e, Carbon County Recovery was 180 ft. of gas-cut mud from the zone 9,338-9,475 ft.

The Chicago Corp. and Republic Natural Gas Co. have completed 1 Wood, C SW 7-13n-49w, Cheyenne County, Nebraska, for 6,500 M.c.f. of gas daily from the J sand. Flow was on open 2-in. tubing. Gage through ¾-in. choke was 2,000 M.c.f. of gas daily, with 640 psi. flowing pressure.

The Denver-Julesburg basin had a record week of new wildcat locations, with 16 exploratory starts announced for the area. Areas active in this campaign range from the southern portion of the basin in Pueblo County, Colorado, to the Chadron arch area of Nebraska.

MONTANA WILDCAT FAILURES

Hill County: Northern Pump Co. 1 Blackstone, NE NE SE 32-32n-16e, dry, TD 4,299 ft., Madison 4,097 ft.

Liberty County: Union Oil Co. of California 1 State 155, C NE 33-35n-7e, dry, TD 2,168 ft., Bow Island 2,118 ft.

Roosevelt County: Ajax Oil Co. 1 Patch, C NE NE 33-28n-51e, dry, TD 5,962 ft., Madison (?) 5,840 ft.

SOUTH DAKOTA WILDCAT FAILURES

Meade County: Ewil Kucera 1 Leo & Alfred Gingrass, SE NE 19-3n-7e, lost hole, skidded rig, TD 1,280 ft., Minnekahta 760 ft. (?).

Perkins County: Shell Oil Co. 1 Veal, C SE SE 7-17n-15e, dry, TD 8,317 ft. Red River 7,131 ft.

WYOMING WILDCAT FAILURES

Hot Springs County: Ajax Oil Co. 1 Anderson-Moore, C NW SW 9-43n-100w, dry, TD 2,168 ft., Tensleep 2,154 ft.

Sweetwater County: Mountain Fuel Supply Co. 2-S, C SW SE 35-13n-101w, dry, TD 7,375 ft., Mesaverde 4,815 ft.

COLORADO SUCCESSFUL WILDCAT

Washington County: Kimbark Company 1 Ward, SE SE SE 3-2s-54w, pumped 35 bbl. oil and 90 bbl. water per day, TD 4,939 ft., "J" sand 4,789 ft.

COLORADO WILDCAT FAILURES

Huerfano County: Lewis Drilling Co. 1 Campbell, NW NW SE 4-29s-69w, dry, TD 4,630 ft., Carlite 4,585 ft.

Logan County: Plains Exploration Co. 1 Wood Land, SW SW NE 10-7n-48w, dry, TD 4,169 ft., "J" sand 4,100 ft.

Moffatt County: Zephyr Drilling Corp. 2 Government SE SE SE 36-4n-104w, dry, TD 1,410 ft., Weber 1,365 ft.

Morgan County: Moore and Gilmore 1 Carter-Anderson, SE NW NW 11-6n-55w, TD 5,444 ft., "J" sand 5,316 ft.

Otero County: Imperial Production Corp. 1 State, C SW SW 13-22s-55w, dry, TD 6,183 ft., Arbuckle 6,079 ft.

WESTERN NEBRASKA SUCCESSFUL WILDCAT

Cheyenne County: Chicago Corp. and Republic Natural Gas Co. 1 Wood, C SW 7-13n-49w, flowed 2,000 M.c.f. gas per day on ¾-in. choke, TD 5,140 ft., "J" sand 4,849 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Hall County: Al Ward 1 Dittfield, SW SW NW 32-9n-11w, dry, TD 3,735 ft., Viola 3,635 ft.

Eddie Fisher and Al Ward 1 State, SE SE NE 36-9n-12w, dry, TD 3,960 ft., Marmaton 3,040 ft.

Logan County: Marvin Miller 1 Baskin, C NE NE 1-18n-28w, suspen., TD 3,934 ft., pre-Cambrian 3,934 ft.

NORTH DAKOTA WILDCAT FAILURE

Towner County: Union Oil Co. of California et al 1 Arne Saari, C SW SE 35-161n-68w, TD 4,499 ft., pre-Cambrian 4,498 ft.

Canadian Fields

More Discoveries For Alberta Announced

CALGARY.—Alberta came through with three more discoveries this week, including the best oil strike to date in the Peace River area, a marginal oil strike on the southern plains, and a gas discovery on the central plains.

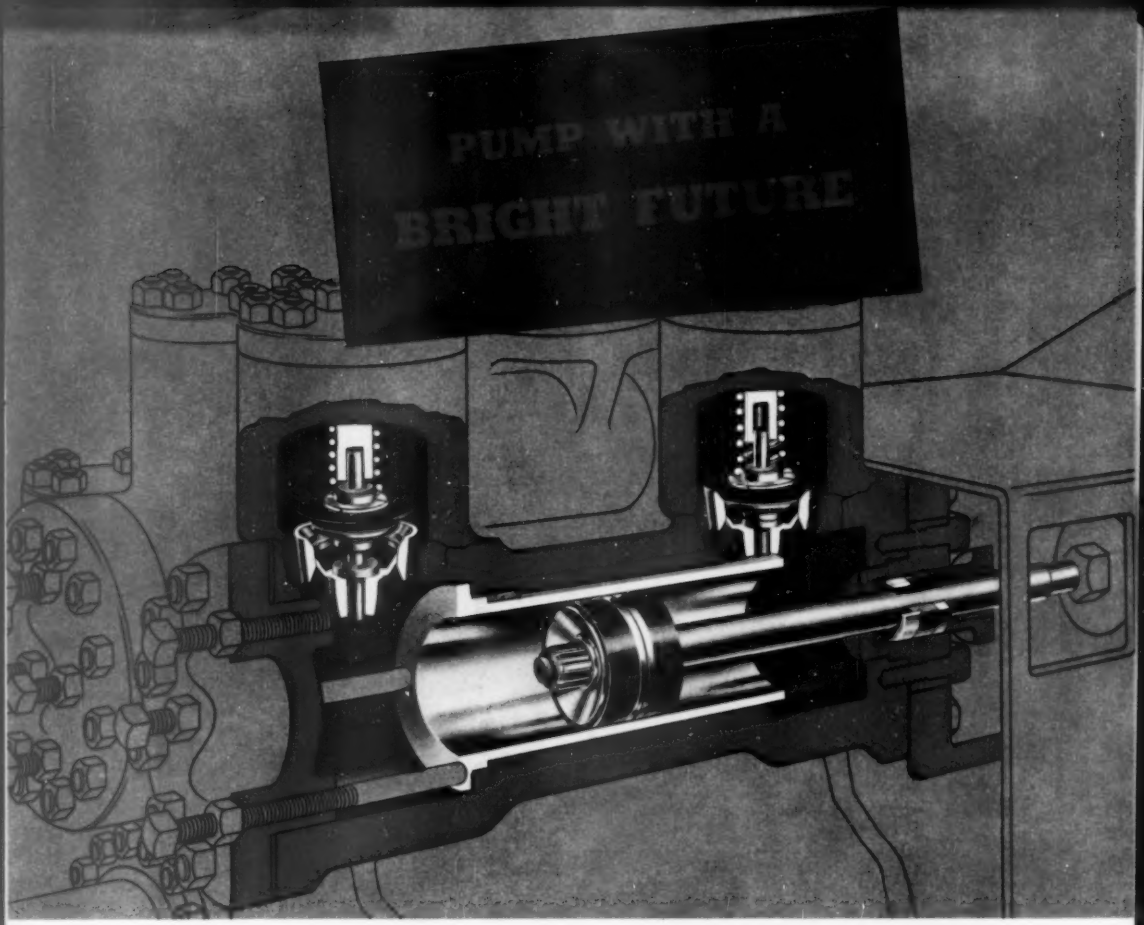
With the new finds, western Canada's record for the 241 day period from January 1 to August 29 this year stands at 124 indicated discoveries, made at a total of 112 wells. Some wells were dual or triple zone discoveries. Many of the wells are not yet completed, and cannot be definitely classed as commercial discoveries. Further development may link some discoveries with others to form a common pool, thus reducing the actual number of new pool finds.

Within these limitations, the western Canadian discovery rate for 1952 may be placed at one strike of oil or gas per two days. Of the finds, 62 showed oil, and an equal number gas, setting discovery rate of oil at one per four days, and the same for gas. Records show Alberta leading with 92 discoveries, provided by 83 wells. Of these, 41 class as oil finds, including 33 light crude strikes, four medium gravity oil, and four heavy crude strikes. Another 42 are gas discoveries, and an additional nine class as wet gas finds.

Saskatchewan is in second place with 21 strikes at 19 wells. These include 15 oil finds, two light crude, five medium, and eight heavy crude. Saskatchewan has six gas finds for the year to date.

British Columbia has accounted for nine strikes from eight wells, principally in the Fort St. John area of northeast B.C. Four finds rate light oil, and five as gas. Manitoba has had two finds of light crude oil this year.

Topping discoveries this week was Amerada Petroleum Corporation's Sturgeon Lake oil strike in northwest Alberta. Amerada 33-32 Crown in LSD 7, 32-71-23w5, discovered about 90 ft. of Devonian reef containing 35°-gravity light crude oil. Reef top was at 8,914 ft. Casing has been set through the pay zone, and will be perforated shortly for production



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tests. This find is the most promising oil strike to date in the Peace River region.

CANADIAN SUCCESSFUL WILDCATS

Stanolind Select Henderson 1 Alix, LSD 9, 11-40-23w4, 5,794 ft., potential gasser.

Hudson's Bay-Union 1 Eaglesham, LSD 5, 13-77-26w5, TD 7,844 ft., potential gasser.

Sage-Meridian-Century-Kenare 1 Rosenheim, LSD 11, 20-37-1w4, TD 5,109 ft., oil well.

Anglo-Socony 1 Twining, LSD 8, 9-31-24w4, TD 8,200 ft., on production, oil well.

CANADIAN WILDCAT FAILURES

British Dominion-Great West 1 Conrad, LSD 3, 17-5-15w5, TD 3,225 ft.

Texaco 1 Sturgeon & Associates, LSD 12, 6-86-1w5, TD 4,440 ft.

Home Oil et al 1 Leo, LSD 16, 25-36-17w4, TD 4,875 ft.

EASTERN CANADA

Quebec.—The 1 Tar Point, on Tar Point anticline, with drilling supervised by Gaspe Oil Ventures and testing a 10,382-acre concession, is below 6,787 ft. after encountering a substantial show of light green high gravity paraffin-base crude at 4,118 ft. Analysis of samples revealed calcite, indicating a fractured zone through which the crude came from a deeper source rock. The oil zone is expected in the upper 600 ft. of a limestone

(Continued on page 183)

Appalachian-Ohio

Pennsylvania Test Running Casing

PITTSBURGH.—In Unity Township, Westmoreland County, Southwest Pennsylvania, Peoples Natural Gas Co. 4003 A. J. Dotterway is running casing at 8,268 ft. The chert was recorded at 8,270 ft. No. 4008 J. R. Frola, is drilling at 4,975 ft.

West Virginia.—Freemans Creek district, Lewis County, West Virginia: Hope Natural Gas Co. 9744 Flossie Reed, resulted in a good gas well in the Gantz sand testing 1,400,000 cu. ft., at a total depth of 2,361 ft. Hardee district, Mingo County, United Fuel Gas Co. 6818 Cotiga Development Co., gaged 1,387,000 cu. ft. of gas in the Brown shale, total depth 4,092 ft. Union district, Preston County, Cumberland & Allegheny Gas Co., announced four new locations: No. 2-478 Clarence Jones, elevation 2,208 ft.; No. 1-495 W. G. Beatty, elevation 1,787 ft.; No. 2-496 W. G. Beatty, elevation 1,836 ft., and No. 1-497 H. E. Bucklew, elevation 2,116 ft.

Maryland.—Garrett County, Maryland, New York State Natural Gas Corp., is cleaning out 2-N-247 after shot. Sour gas in unrecorded formations was encountered at 6,075 ft., and 7,140 ft., Cumberland & Allegheny Gas Co. 1 Noah Shrock is drilling at 4,470 ft. No. 2 Harry Rice reached the chert at 3,633 ft., and is drilling at 3,647 ft. W. H. & A. A. Rader, 1 Pleasant Valley Church, after being shut down with a fishing job at 2,809 ft., has again resumed drilling and is at a depth of 2,950 ft. Superior Oil Development Co. 1 Wilt & Jacobs is drilling at 4,425 ft.

OHIO

One of the few gas wells to be found in Bladensburg pool was brought in by Wray Drilling Co. on Gaylord Rine, Section 7, Jackson Township, Knox County. Clinton

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sand was found at 2,780-90 ft. with an open flow of 1,330,000 cu. ft. natural, and a rock of 800 psi. In the southwest part of the Township, Mid East Oil Co. has drilled-in a well on Gabrielle Dalmasso, Section 25, having a good showing of oil and gas in the Clinton sand at 2,737-84 ft. that looks like a 1-mile southwest extension of Mt. Zion pool. The well is to be shot before completing.

Roy Stewart et al have completed a good gasser in Prairie Township, Holmes County, on 1 Clark Smith. Clinton sand was topped at 3,520 ft. and drilled in to 45 ft. with a natural gage of 1,200,000 cu. ft.

Kansas

Stafford County Wildcat Opens New Arbuckle Pool

ANSCHUTZ DRILLING CO. is opening a new Arbuckle lime producing area about midway between the Northwest Drach and Fischer pools in northern Stafford County where its 1 Bunselmeyer, in the NE NE NE 2-22-13, has been put on the pump for completion. The well pumped 200 bbl. of oil, without any water, in the first 16 hours, averaging 12½ bbl. per hour. On a previous 2-hour swabbing test it made 67 bbl. Arbuckle, topped at 3,652 ft. and drilled to 3,750 ft., is open through casing perforations at 3,669-76 ft.

In southwestern Graham County, The Texas Co. is continuing tests at its 1 Fox, NW SE SW 29-8-24, a possible Lansing discovery well. In a test after perforating casing at 3,850-56 ft. with hole plugged back to 3,874 ft., the well swabbed initially at the rate of 2 bbl. of oil per hour. However, after a 500-gal. acid injection, it made only 41 gal. of oil with 13 gal. of water per hour. Hole previously had been drilled to 4,400 ft. in Arbuckle, topped at 4,352 ft.

E. K. Carey and H. E. Zoller 1 Monaghan, SW SW SW 15-2s-27w, a rank wildcat in northeastern Decatur County, on the west flank of the Central Kansas Uplift, swabbed 5 bbl. of oil per hour for 4 hours after perforating casing at 3,602-06 ft., in the Lansing-Kansas City lime section, but recovery later dropped to 1 bbl. per hour. A higher zone, opposite which casing has been perforated at 3,566-69 ft., now is being tested.

KANSAS WILDCAT FAILURES

Butler County: Saturn Drilling Co. 1 Stone, NW NW NE 23-24e-7e, dry, TD 2,755 ft.
Decatur County: Carey 1 Wachendofer, NE NE SW 35-5s-29w, dry, TD 4,525 ft.
Ellis County: Imperial 1 Herman "B," NW NE SE 21-13s-20w, dry, TD 3,942 ft.
Marion County: G. Martin 1 Boettcher, SW SW SE 11-19s-4e, dry, TD 2,666 ft.
Pratt County: M. B. Armer 1 Wagner, SW SW NE 34-28s-11w, dry, TD 4,625 ft.
Rush County: E. H. Adair 1 Oborny, SE SE SE 13-18s-18w, dry, TD 3,890 ft.
Russell County: Duke & Wood 1 Keil, SW SW NE 32-15s-14w, dry, TD 3,432 ft.
Saline County: Jones, Shelburne & Farmer 1 Markley, NE NE NW 16-13s-1w, dry, TD 3,335 ft.
Sheridan County: Anschutz Drilling Co. 1 Phillips-Marshall, SW SW SW 30-7s-26w, dry, TD 4,515 ft.
Sherman County: Kingwood 1 Rauckman, SE SE NE 11-8s-40w, dry, TD 5,573 ft.
Stafford County: Westgate-Greenland 1 Hohner, NE NE SW 22-23s-14w, dry, TD 4,067 ft.
Anschutz Drilling Co. 1 Galloway, SW SW NW 16-24s-12w, dry, TD 4,080 ft.
Trego County: Jones, Shelburne & Farmer 1 Deines, NE NE SW 15-14s-24w, dry, TD 4,450 ft.
Wallace County: Delhi 1 Worley, SW NE SE 27-12s-42w, dry, TD 5,590 ft.

Central Area

ILLINOIS

Another McClosky lime pool appears to have been uncovered by Herndon Drilling Co. at its 1 Curtis, SE SE SW 27-2s-10e, 4 miles southwest of Albion in southwestern Edwards County, where 630 ft. of clean oil and 120 ft. of mud-cut oil was recovered in a 60-minute drill-stem test at 3,231-41 ft. Operators have run casing through the zone to 3,310 ft. in hole drilled to 3,362 ft. Location is northwest of the Ellery South pool and east of the Mitchell pool.

T. S. Doran is putting his 1 Flannigan, SE NE NE 10-3s-2e, 4 miles southwest of Mount Vernon, Jefferson County, on the pump for completion following swabbing tests in which the well produced at the rate of 40 bbl. of oil per day. The discovery is more than ¾ mile from other production in that area.

INDIANA

George & Wrather and Aubrey & Tennant 1 Anslinger, which opens a new O'Hara producing area 8 miles southeast of Princeton, in the south central part of Gibson County,

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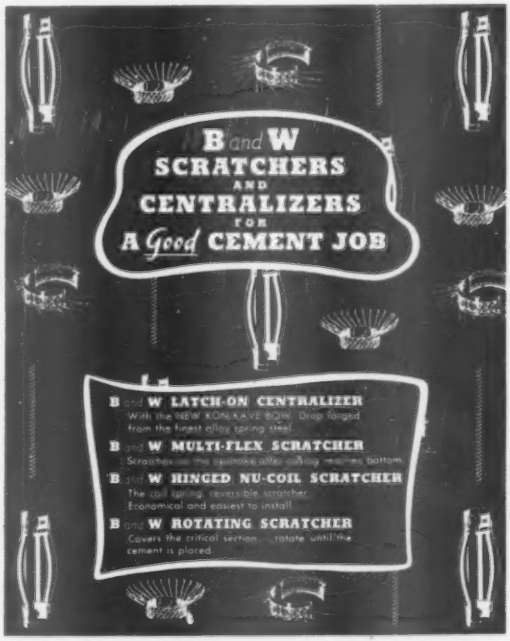
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swabbed 12 bbl. of oil per hour initially after acidizing with 2,000 gal. Production later dropped to about 6 bbl. per hour. Pay is open through casing perforations at 2,025-29 ft. in hole drilled to 2,150 ft. Location is in the NW SE NW 13-3s-10w, which is about 2 miles from nearest production.

A new pay zone for the Hovey area, 4 miles southwest of Mount Vernon, in southwestern Posey County, appears to have been discovered by Sinclair Oil & Gas Co. at its 1 Roos, NE SE SE 22-7s-14w. It is in the lower Renault lime, from which, in a drill-stem test at 2,628-38 ft., the well flowed gas in 2 minutes and clean oil in 10 minutes. Hole has been drilled to 2,904 ft. and casing run to 2,680 ft., through the O'Hara, in which slight oil shows were encountered at 2,658-60 ft.

Buell Abney has placed his 2 Cornelius, NE SE SW 6-5n-5w, on the pump, making 45 bbl. of oil per day, to open a new, shallow Aux Vases sand pool in northern Daviess County. Pay is at 551-53 ft. Location is just south of the Greene County line, and 4 miles from nearest production.

WESTERN KENTUCKY

Felmont Oil Co. has a 65-bbl. pumper at its 1 Parker, a wildcat located in 22-O-26, 2 miles southwest of St. Joseph in the extreme western tip of Daviess County. Production is from Benoist sand at 1,992-2,002 ft. Location is a mile south of the St. Joseph pool.

EASTERN KENTUCKY

In Big Sandy gas field and in the Pike County sector, Kentucky West Virginia Gas Co. have completed a good well on their 6036 Bowles and Ratliff lease on Rockhouse Creek. Topping Maxon (Mississippian) sand at 2,006 ft., well flowed gas at the rate of 1,212,000 cu. ft. of gas daily from a total depth of 2,184 ft. Well had a rock pressure of 580 psi.

Kentucky West Virginia Gas Co. completed 6054 Miles Coleman on Rockhouse Fork in Pike County for an open flow potential of 780,000 cu. ft. of gas daily from the Maxon sand and the Devonian black shales. Maxon was topped at 1,835 ft. and Devonian shale at 3,250 ft. Test bottomed at 4,016 ft. and was brought in natural.

MICHIGAN

Deepened in the Richfield from 4,180 ft. to the black lime Richfield base (below 4,217 ft.), it did not appear that any additional pay section had been drilled at Ogma Development Co. 1 Weiler, E½ SE SW 14-22n-1e, Ogemaw Township, Ogemaw County, potential Richfield oil discovery well on the big West Branch structure. Well was scheduled to be tubed and acidized with 6,000 gal. Best pay zone drilled was reported at 4,165-77 ft., with a lighter pay reported at 4,127-35 ft. Well was reported to be swabbing from 3 to 6 bbl. of oil a day natural from these pays. Some water which has been showing was believed to be coming from the upper porosity zone in the Richfield.

Ogma Development Co. had location staked and some material on the ground for another well, located in the W½ SW SE 14-22n-1e, the east offset to the 1 Weiler.

Dow Chemical Co. 32 Fee, SE NE NE 27-19n-18w, Hamlin Township, Mason County, a chemical brine test well which logged a 12-15 million-cubic-foot gas pay in the basal Salina-Niagaran contact zones, but which was scheduled to be drilled to the granite, at about 7,000 ft., was shut down for orders at 6,622 ft., short of its objective. Well was reported to be in hard, sharp sandstone which was chewing up diamond coring bits. The 32 Fee was scheduled for completion as a chemical brine well regardless of what was logged in drilling to the basement. It will not be completed in the gas pay section. The showing of gas in the Salina-Niagaran prompted an active leasing play in the area. One offset well has been spudded, while eight other locations close in have been staked. Taggart Bros. Gas Co., at the 1 Degen-Phillips, NW SE NE 27-19n-18w, the offset to the 32 Fee, was being drilled at a slowed down pace in Sylvania sand below 2,730 ft. The Taggart well, if productive in the objective gas zone, will be credited as the discovery in this area.

ILLINOIS SUCCESSFUL WILDCATS

Gallatin County: Ashoff & McGuire et al 1 Logsden, NE NW NW 23-9s-10e, IP 50 bbl., Aux Vases 2,660-70 ft., TD 2,670 ft. (discovery well Shawneetown East pool).

Richland County: Bell Brothers 1 Young, SE SE NW 33-5n-10e, IP 144 bbl., McClosky 2-905-11 ft., TD 2,915 ft. (extension Clay City-Nobie Consolidated pool).

ILLINOIS WILDCAT FAILURES

Christian County: J. W. Miloncus 1 Garney, NE SW SW 15-14n-3w, dry, TD 2,396 ft.

Clark County: Continental Oil Co. 1 Hoirington, SW SW NE 8-11n-10w, dry, TD 2,193 ft.

Clay County: Aurora Gasoline Co. 1 Valbert, SW SE NW 14-2n-6e, dry, TD 3,179 ft.

Edwards County: George & Wrather 1 Gould-Ridens, NW NW NE 7-1s-14w, dry, TD 2,444 ft.

Hamilton County: Murphy Oil Co. 1 Johnson, NE NW NE 36-6s-6e, dry, TD 3,350 ft.

Madison County: C. P. Douglas 1 Hemann, SE SE NW 17-6n-5w, dry, TD 700 ft.

Milton Smith 1 Sawyer, NE NE NW 4-5n-6w, dry, TD 700 ft.

Marion County: E. White 1 Saunders community, SW NE NW 23-1n-1e, dry, TD 885 ft.

Ervin & Bassett 1 Hawkins, NE SE NW 11-1n-2e, dry, TD 2,255 ft.

Perry County: Stephens Oil Co. 1 Besma et al, NW SE NE 13-4s-2w, dry, TD 1,336 ft.

Sangamon County: Gerhardt & Gerhardt 1 Puls, NE SW SW 15-15n-7w, dry, TD 1,450 ft.

Wabash County: Ralph Halbert 1 Chapman, NE SW SW 13-1s-13w, dry, TD 2,619 ft.

George S. Engle 1 Hilbert, SE SE NE 36-1s-13w, dry, TD 2,662 ft.

Washington County: John Beadleston 1 Mozelewski, SE SW NE 13-2s-3w, dry, TD 1,471 ft.

W. J. McGlasson 1 Frederking, NE NE SE 20-3s-4w, dry, 2,485 ft.

Wayne County: Tuley & Carter 1 Beeb et al, SE SE NW 33-2n-6e, dry, TD 3,225 ft.

C. E. Brehm 1 Smith SW SW NE 11-3s-6e, dry, TD 3,456 ft.

INDIANA SUCCESSFUL WILDCATS

Knox County: National Associated Petroleum Co. 2 Wilson, Military Donation 170-2n-9w, IP 58 bbl., Cypress 1,272-80 ft., TD 1,607 ft. (extension Monroe City West pool).

Posey County: J. H. Gilliam 1-A Duckworth, SW NE SE 27-7s-14w, IP 10 bbl., Pennsylvanian 1,124-34 ft., TD 1,134 ft. (discovery well West Hovey South pool).

INDIANA WILDCAT FAILURES

Daviess County: Graham Development Co. 1 E. Graham, NW SE NW 12-3n-8w, dry, TD 1,286 ft.

Gibson County: W. C. McBride 1 Jones, Military Donation 76-1s-10w, dry, TD 1,870 ft.

(Continued on page 182)

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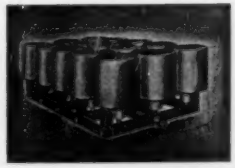

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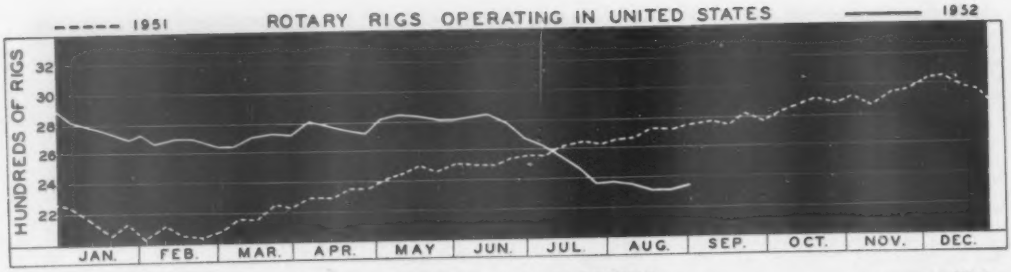
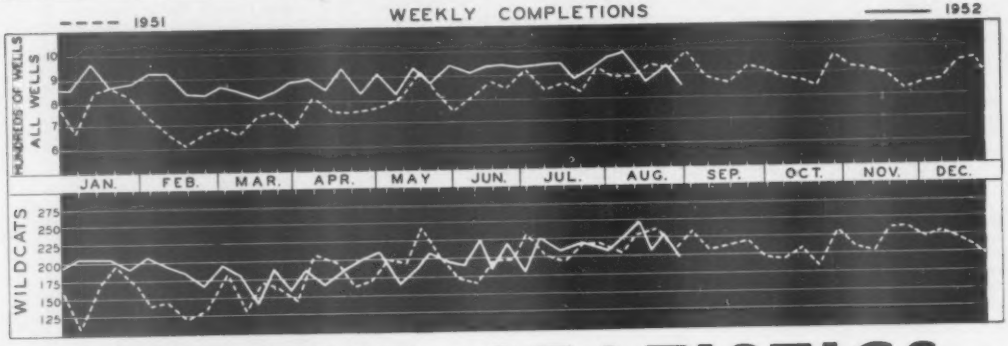




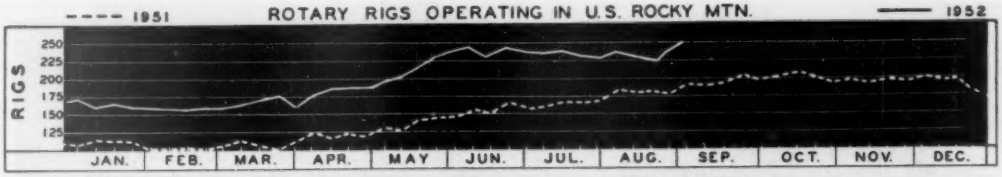
CURRENT STATISTICS

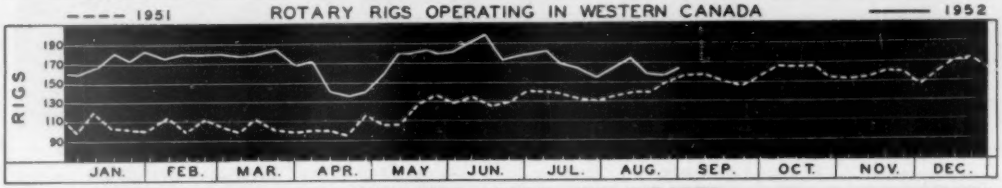
EXPLORATION

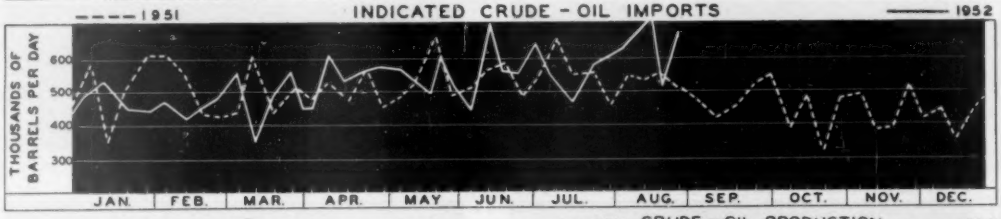
WEEKLY WELL COMPLETIONS . . . WEEK ENDED AUGUST 30, 1952

	Total of all wells					Aug. 30		Wildcat completions and discoveries					Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	18	9	0	*9	26,375	506	432	0	0	0	0	0	0	0	0	2	2
Pennsylvania	47	21	5	†21	86,200	1,284	1,114	0	0	0	0	0	0	0	0	2	2
West Virginia	17	1	11	5	41,691	423	386	0	0	0	0	0	0	0	2	5	7
Ohio	25	8	8	9	55,860	673	623	0	0	0	0	0	2	0	7	16	25
Indiana	31	13	0	18	56,812	834	817	2	0	0	11	13	24	0	2	239	265
Kentucky	26	7	5	14	51,496	858	792	1	0	0	6	7	16	0	1	167	184
Illinois	58	20	1	37	145,894	1,293	1,611	2	0	0	17	19	12	0	0	371	383
Michigan	15	0	1	14	30,162	480	521	0	0	0	5	5	21	0	4	162	187
Kansas	74	40	5	§29	251,105	3,170	2,938	0	0	0	14	14	71	0	10	508	589
Nebraska	8	0	1	7	32,626	192	149	0	0	1	7	8	7	0	2	104	113
Oklahoma	92	41	9	‡42	329,705	3,912	3,727	0	0	0	12	12	76	2	8	411	497
Texas	312	172	32	108	1,599,588	11,912	11,159	10	1	5	66	82	536	39	84	2,549	3,208
North Central (Dist. 7-B & 9)	87	50	0	37	318,602	3,749	3,391	9	0	0	23	32	303	2	23	1,072	1,400
West (Dist. 7-C & 8)	82	66	1	15	535,295	3,701	3,353	1	0	0	8	9	115	0	5	457	577
Panhandle (Dist. 10)	23	4	17	2	63,862	466	831	0	0	0	0	0	4	0	6	35	45
Eastern (Dist. 5 & 6)	19	12	0	7	87,161	648	471	0	1	0	6	7	15	4	2	154	175
Gulf Coast (Dist. 2 & 3)	61	26	12	23	411,407	1,755	1,555	0	0	3	12	15	56	23	21	361	461
Southwest (Dist. 1 & 4)	40	14	2	24	183,261	1,593	1,558	0	0	2	17	19	43	10	27	470	550
Louisiana	37	15	3	19	235,539	1,535	1,403	0	1	0	5	6	28	15	11	200	254
Northern	23	9	1	13	84,339	830	756	0	0	0	2	2	12	0	7	92	111
Southern	14	6	2	6	151,200	705	647	0	1	0	3	4	16	15	4	108	143
Arkansas	7	6	0	1	15,385	260	266	0	0	0	1	1	5	0	0	51	56
Mississippi	5	2	0	3	31,959	234	233	0	0	0	3	3	13	2	1	107	123
Southeastern States	1	1	0	0	6,275	43	36	0	0	0	0	0	3	0	1	24	28
Montana	4	1	0	3	14,203	198	137	0	0	0	3	3	4	0	1	48	53
Wyoming	8	5	0	3	32,432	459	470	0	0	0	2	2	18	0	3	75	96
Colorado-Utah	11	5	0	6	53,600	343	169	1	0	0	5	6	17	0	7	138	162
New Mexico	16	9	4	3	106,159	706	439	2	0	0	2	4	26	2	1	72	101
California	37	29	2	6	158,477	1,629	1,488	0	0	1	5	6	57	0	5	315	377
North Dakota	1	0	0	1	4,499	49	3	0	0	0	1	1	3	0	0	15	18
Miscellaneous (S. D.)	2	0	0	2	9,597	51	73	0	0	0	2	2	0	0	18	20	38
Total United States	852	405	87	360	3,375,639	31,044	28,986	18	2	7	167	194	939	60	168	5,601	6,768
Total previous week	934	469	67	398	3,828,260			39	4	5	180	228	921	58	161	5,434	6,574
Total September 1, 1951	993	513	78	402	3,813,271			33	2	3	194	232	988	50	174	5,224	6,436

Service wells included: *9, †18, ‡5, §1.





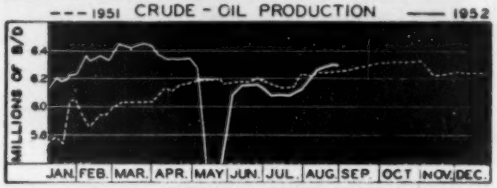


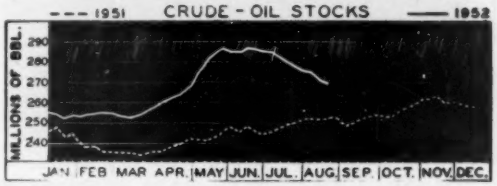
DAILY AVERAGE PRODUCTION FOR WEEK

	August 30, 1952 Crude oil	Lease condensate	Total	Aug. 23 total
Alabama	2,900	.....	2,900	2,850
Arkansas	75,125	625	75,750	†79,150
California	988,000	.....	988,000	988,200
Colorado	86,600	.....	86,600	83,700
Eastern	57,000	.....	57,000	58,900
Florida	1,650	.....	1,650	1,700
Illinois	167,700	.....	167,700	165,300
Indiana	33,800	.....	33,800	33,700
Kansas	325,400	.....	325,400	331,700
Kentucky	32,300	.....	32,300	32,800
Louisiana	638,325	25,150	663,475	667,975
North	112,200	2,150	114,350	†118,850
South	526,125	23,000	549,125	549,125
Michigan	39,100	.....	39,100	43,200
Mississippi	93,200	3,300	96,500	96,000
Montana	25,000	.....	25,000	26,900
Nebraska	6,900	.....	6,900	7,000
New Mexico	160,500	300	160,800	160,800
Oklahoma	531,400	.....	531,400	530,600
Texas	2,749,275	41,575	2,790,850	2,790,850
Dist. 1	33,175	125	33,300	33,300
Dist. 2	151,100	3,850	154,950	154,950
Dist. 3	446,850	24,000	470,850	470,850
Dist. 4	244,950	4,400	249,350	249,350
Dist. 5	45,200	200	45,400	45,400
Dist. 6	117,825	3,600	121,425	121,425
East Texas field	263,000	.....	263,000	263,000
Dist. 7-B	98,000	50	98,050	98,050
Dist. 7-C	148,725	4,900	153,625	153,625
Dist. 8	939,875	200	940,075	940,075
Dist. 9	178,475	250	178,725	178,725
Dist. 10	82,100	.....	82,100	82,100
Utah	4,900	.....	4,900	4,300
Wyoming	186,000	.....	186,000	183,000
North Dakota	5,500	.....	5,500	4,500
Total U. S.	6,210,575	70,950	6,281,525	†6,293,125
Change from previous week, down			11,600	
Canada	206,000	.....	206,000	210,500

Total U. S. production January 1-August 30 ..... †1,482,739,497 bbl.
Same period last year (crude plus cond.) ..... *1,479,769,300 bbl.

*Includes 19,786,650 bbl. condensate. †Revised to exclude some plant production reported as lease condensate.



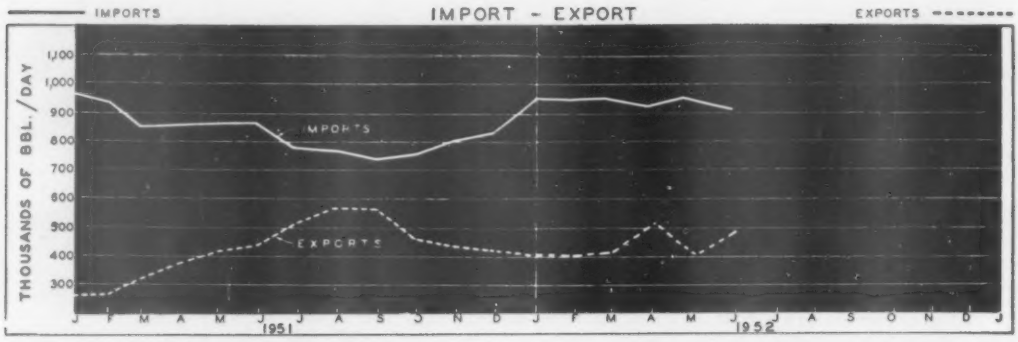


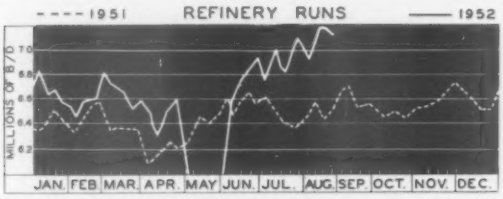
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

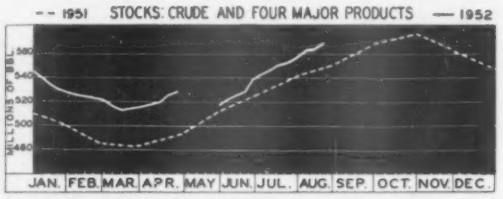
(Thousands of barrels)

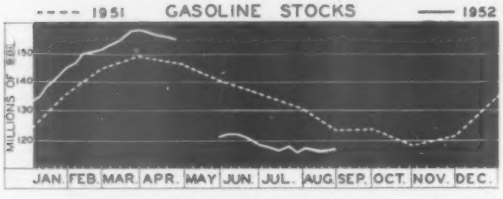
	Aug. 23, '52	Aug. 16, '52	Aug. 25, '51
Pennsylvania Grade	2,385	2,406	2,111
Other Appalachian	2,150	2,044	1,663
Illinois, Indiana, Michigan	12,673	12,843	11,049
Arkansas	3,109	3,147	2,650
Louisiana	14,523	15,536	14,283
North	2,352	2,338	2,748
Gulf	12,171	13,198	11,535
Mississippi	3,660	3,761	3,151
New Mexico	7,451	7,489	6,461
Oklahoma and Kansas	39,354	40,329	38,563
Texas	129,829	129,700	120,262
East Texas proper	13,241	12,937	(†)
West Texas	57,784	57,056	(†)
Texas Gulf	27,065	28,010	(†)
Other Texas	31,739	31,697	(†)
Rocky Mountain	14,612	14,277	13,353
California	30,584	30,673	30,445
Foreign	8,861	8,361	8,266
Total	269,191	270,566	252,257

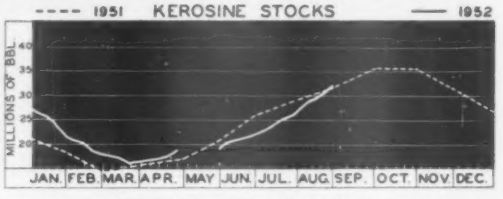
*Bureau of Mines. †Not comparable with current week.

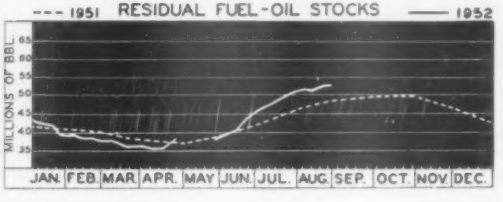










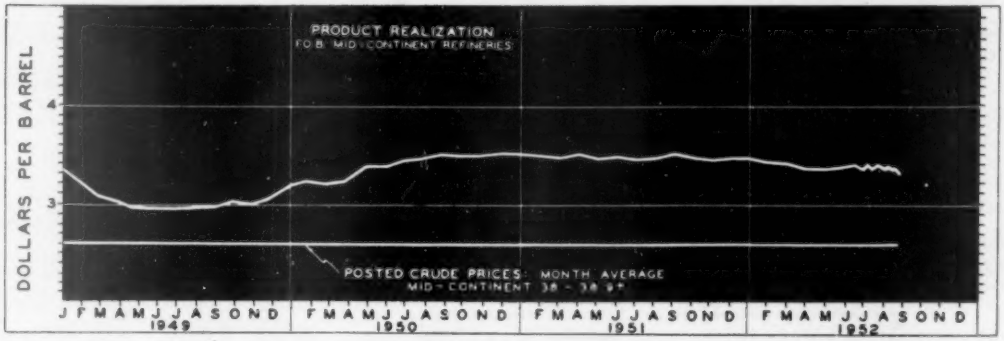


A.P.I. REFINERY REPORT, AUGUST 30

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, August 1951 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,081	445.0	38.9	243.1	220.0	29,874	13,776	37,446	12,629	1,026	415.3	41.0	230.1	228.1
Appalachian:														
District 1	108	46.4	5.3	15.4	11.9	3,670	605	1,516	824	104	41.6	5.3	17.4	11.9
District 2	52	40.6	.6	14.4	14.8	1,802	292	543	391	73	33.1	3.5	8.9	15.7
Ind., Ill., Ky.	1,359	707.0	77.9	250.0	170.6	24,065	6,998	21,205	6,551	1,203	640.4	69.9	197.2	150.5
Okla., Kans., Mo.	617	335.6	13.7	135.3	68.1	11,089	1,898	12,443	1,578	482	264.6	11.8	117.1	53.1
Inland Texas	258	174.1	13.0	48.1	35.1	3,982	464	1,999	1,013	256	173.0	12.5	39.2	41.5
Texas Gulf Coast	1,760	771.6	135.8	420.3	278.4	16,177	4,128	10,480	8,028	1,586	739.9	118.9	312.0	257.0
La. Gulf Coast	527	256.7	71.1	125.9	57.0	6,149	2,529	2,928	1,987	501	235.0	54.9	118.7	59.8
N. La. and Ark.	88	33.3	7.7	21.9	6.0	2,698	612	1,023	216	85	35.0	7.9	16.7	7.7
Rocky Mountain:														
New Mexico	19	10.7		2.9	3.9	100		73	30	16	9.0	0.1	3.3	3.7
Other Rocky Mtn.	242	115.1	9.3	41.7	44.3	3,063	455	2,126	1,259	227	103.4	5.2	43.5	41.1
California	999	483.3	7.3	145.7	352.6	14,571	323	10,166	17,790	980	423.7	7.9	132.5	355.5
August 30, 1952	7,110	3,419.4	380.6	1,464.7	1,262.7	117,240	32,080	101,948	52,296	6,539	3,114.0	338.9	1,236.6	1,225.6
August 23, 1952	7,174	3,414.9	367.6	1,479.9	1,308.7	116,393	30,814	99,085	52,104	.....	.....	.....	.....	.....
September 1, 1951	6,666	3,162.9	374.6	1,367.4	1,248.7	124,932	32,900	93,861	48,718	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES - MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
1950
J F M A M J J A S O N D
1951
J F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.29 for week ended August 16, $3.33 for previous week, and $3.48 for August 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of September 3, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅜-10½	12.125-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅜-11½	13.75-14.0	11¾-12
42-44 w.w. kerosine	8½-8¾	10.4-10.65	9-9.25
No. 2 straw fuel oil	7½-8	9.4-9.65	8-8.25
No. 6 residual	$0.90-1.00	$2.10-2.25	$1.50-1.75

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	27-28
200 vis., No. 3 neutral, 0-10 pp.	14.5-15.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

LIGHT heating fuels in the Group 3 area have reached the point in the season where most suppliers are waiting to see how distillates will move in September and October.

Many refiners have distillates in storage which they would like to move to make room for the portion of distillate production in September and October that must go to primary storage. However, storage space for these suppliers is not enough of a problem to force them to accept distress prices for material on hand. If movement to secondary and consumer storage can be maintained by sales efforts for the next few weeks, normal seasonal increases in demand for heating oils will reduce need for additions to primary storage. The greatest pressure on distillate markets from crowded storage will probably come in the first half of October.

Lower tanker rates for dirty vessels have tended to increase the movement of residual fuel from the Gulf Coast to points on the East Coast, resulting in additional pressure on heavy-fuel markets on the East Coast.

Suppliers of Districts 1 and 3 have moved all surplus distillate fuel from the Gulf Coast to the East Coast in order to have stocks near points of consumption. District 3 stocks are slightly less than last year while East Coast distillate stocks are about 3.8 million barrels greater than last year. District 1 stocks gained 13,000,000 bbl. in the past 6 weeks compared with an increase of only 3,600,000 bbl. in District 3. Rapid increases in District 3 will indicate full tanks on the East Coast.

Continuing high demand for motor fuel has resulted in another increase in natural-gasoline prices. Effective September 3, Grade 26-70 natural moved up another 0.5 cent a gallon to reach ceilings of 6.875 cents for Group 3 and 6.375 cents for North Texas.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.	
Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

Permian Basin

(Continued from page 160)

ft., Simpson 11,060 ft., Ellenburger 11,260 ft.

Garza County: Urice Drilling Co. 1 Leland F. Lang, Sec. 1,111, TWNG Sur., dry, TD 8,524 ft., elev. 2,446 ft., Strawn 7,742 ft., Mississippian 8,148 ft., Ellenburger 8,442 ft.

Howard County: Stanolind Oil & Gas Co. 1-A Susie B. Snyder, 20-30-T1S-T&P, dry, TD 9,191 ft., elev. 2,398 ft., Mississippian 8,610 ft., Ellenburger 8,868 ft.

Kent County: F. A. Callery, Inc. 1 E. E. Wallace, 60-G-W&NW, dry, TD 7,641 ft., elev. 2,253 ft., reef 6,954 ft., Mississippian 7,334 ft.

Runnels County: S. C. Herring Drilling Co. 1 Billups, E. H. Willingham Sur. 55½, dry, TD 4,441 ft.

Tom Green County: Seaboard Oil Co. of Delaware 1 Nona Kent, Sec. 161, SPRR Sur., dry, TD 4,820 ft., elev. estimated 2,013 ft., Strawn 4,569 ft.

SOUTHEAST NEW MEXICO

A two-location north extension to the East Caprock area in Lea County, New Mexico, has been completed at Amerada 1-ECE State. The extender was finaled for a calculated flow of 1,321.2 bbl. of 43.2-gravity oil, based on 15-hour actual flow of 825.78 bbl. of oil plus 0.16 bbl. of drilling water through ¼-in. tubing choke. Pay was from Devonian above total depth of 11,283 ft. Tubing pressure was 500 psi. and casing 800 psi. Gas-oil ratio was 17:1. Gas volume was 22,040 cu. ft. daily.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCATS

Eddy County: Allan Hargrave 1 Humble-State, 21-24s-27e, TD 2,311 ft., elev. 3,213 ft., Delaware sand 2,295 ft., pay 2,300 ft., IP pumped 17 bbl. 43°-gravity oil.

Lea County: Tide Water Associated Oil Co. 1 H. T. Monteith, 20-16s-37e, TD 11,925 ft., elev. 3,834 ft., pay 11,256 ft., IP 754 bbl. 42°-gravity oil, ¾-in. choke, TP 200 psi., GOR 1,302 cu. ft.

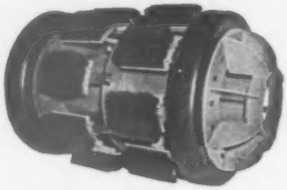
SOUTHEAST NEW MEXICO WILDCAT FAILURES

Chaves County: Magnolia Petroleum Co. 1 Burt-Federal, 5-8s-30e, dry, TD 8,015 ft., elev. 4,040 ft., Mississippian 7,505 ft., Devonian 7,965 ft.

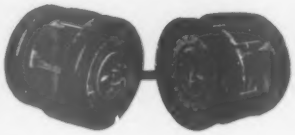
Roosevelt County: Austral Oil Exploration Co. 1 A. A. Sadler, 29-4s-32e, dry, TD 8,154 ft., elev. estimated 4,424 ft., Abo 6,220 ft., Pennsylvanian 6,980 ft., Silurian dolomite 7,730 ft., Montoya 7,820 ft.

THE PIG WITH THE POKE — CLEANS PIPE LINES

MORE CUBIC FEET PER DAY... THROUGH NATURAL GAS LINES CLEANED by WILLIAMSON PIGS

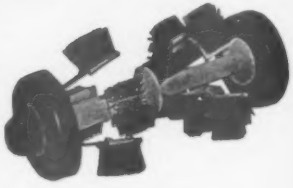


GP-2 16"-30"
Similar design 10" to 14" sizes. Will traverse all standard pipe-line gate valves and field bends of approx. 12 ft. radius.



GP-3 18"-30"
Similar design 10" to 16" sizes. Will traverse long-radius welding ells up to 90° lengths. Also through port and many conventional gate valves.

WC-12 6"-14"
Will traverse all standard pipe-line gate valves and field bends.



Other designs for sizes smaller than 6"

REPRESENTATIVES

H. E. Davis, Los Angeles 15, Calif. — James S. Kone Co., Amarillo, Texas — Keyes Tank Co., Provo, Utah — Keyes Tank & Supply Co., Casper, Wyoming

Canadian Equipment Sales & Service Co., Ltd., Edmonton, Calgary, Toronto, Canada

WRITE FOR COMPLETE INFORMATION

T. D. Williamson, Inc.
TULSA 9, OKLAHOMA

North Central Texas

(Continued from page 162

ft. KMA lime 3,950 ft., KMA sand 4,030 ft., Kadane sand 4,294 ft.

Martin Properties 1 L. Kinder, Blk. 5, Clark & Plumb, dry, TD 3,913 ft.

Frank Wood Associates, Inc. 1 E. H. Prideaux, S. H. Smith Sur., dry, TD 776 ft.

Coleman County: Callahan Rotary Co. et al 1 Press Galloway, Sec. 15, J. H. Gibson Sur., dry, TD 3,563 ft.

Davis Drilling Co. 2-A Mrs. Georgia Teagle, 272-116-Wade H. Bynum Sur., dry, TD 2,031 ft.

Western Petroleum Co. et al 1 J. B. McCord, Sec. Sec. 689, H. R. A. Wiggington Sur., dry, TD 3,431 ft.

Eastland County: Leland Fikes 1 E. Freyschlag, T. R. Foster Sur., dry, TD 3,601 ft., Lake sand 2,969 ft., Ranger 3,225 ft., Mississippian 3,584 ft.

Fisher County: C. L. Norsworthy, Jr. 1 James Cave, 113-3-H&TC, dry, TD 7,130 ft.

Grayson County: Pan American 1 Umphress, Eli Jones Sur., A-632, dry, TD 8,886 ft.

Haskell County: Gilliam Drilling Co. 1 Russell Rainey, Blk. 122, D. I. Woodlief Sur., dry, TD 5,649 ft.

Jack County: Elm Oil Co. 1 Sara E. Perrin, Geo. Scull Sur., A-525, dry, TD 4,631 ft.

Russell Maguire 1 Price Est., Lot 2,738, TE&L Sur., dry, TD 5,100 ft.

Perkins & Cullum 1 A. A. Kinder, WCRR Sur., A-907, dry, TD 3,260 ft.

Frank Wood Associates, Inc. 1 A. L. Campsey, Wm. Beck Sur., A-2,007, dry, TD 4,103 ft.

Jones County: United Oil Exploration Co. 1 Norman Barry, Sec. 9, OAL Sur., dry, TD 2,452 ft.

Knox County: Yeatman Drilling Co. 1 W. S. Davis, D. G. Burnett Sur. 3, dry, TD 5,205 ft.

Montague County: An-Son Petroleum Corp 1 N. E. Heath, Sec. 12, Limestone CSL, dry, TD 6,682 ft.

Elm Oil Co. 1 Robert Russell, Sec. 107, A. Buffington Sur., dry, TD 6,192 ft.

Harvey Drilling Co. 1 E. R. Mangum, Blk. 23, Limestone CSL, dry, TD 6,410 ft.

Shackelford County: C. B. Christie 1 Chloe A Nail, Sec. 148, ETRR Sur., dry, TD 1,728 ft.

Stephens County: Robinson-Puckett et al 1 Celia McCrea, 63, BAL Sur., dry, TD 4,500 ft.

Stonewall County: General Crude Oil Co. 1 A. P. Kennedy, 173-1-H&TC, dry, TD 6,092 ft.

EQUIPMENT MEN . . . in the News

Major Executive Changes Named by Universal Oil

David W. Harris, president of Universal Oil Products Co., Chicago, has

M. P. VENEMA

M. D. GILCHRIST

J. C. RAAEN

SUTHERLAND

announced several major executive changes within the organization.

M. P. Venema, formerly a vice president, has been elected executive vice president; M. D. Gilchrist elected vice president with responsibility for sales; Col. J. C. Raaen, elected vice president with responsibility for Universal's Research and Development Laboratories, remaining as general manager, and R. E. Sutherland, elected a vice president with responsibility for all engineering functions.

Edwin F. Nelson, formerly a vice president in charge of engineering, has resigned to enter business in Superior, Wis. He will continue his association with Universal in a consulting capacity.

Worthington Names Finn Assistant Sales Manager

W. A. Finn has been named assistant general sales manager of Worthington Corp., according to announcement by T. J. Kehane, assistant vice president and general sales manager. Finn, who is returning from Paris, France, where he has been serving as general European manager, will make his new headquarters at Worthington's Harrison, N. J., offices.

Finn joined Worthington in 1922 as an application and sales engineer in the steam power division. From 1930 to 1941 he acted as New England district sales manager, and was granted a leave of absence until 1946 to serve with the U. S. Navy. He rejoined Worthington in 1946 as manager of the export department.

Parkersburg Promotes Lowd

Judson D. Lowd has been appointed assistant general manager, pressure-vessel operations, of The Parkersburg Rig & Reel Co., according to W. V. Rathbone, vice president and general manager of the company.

J. D. LOWD

Lowd will continue to be located in Houston where he served as manager of pressure-vessel sales, prior to his new position.

United Tests Centrifugals For Pipe Line Service

H. A. Johns, chief engineer of Gulf Refining Co., pipe-line division, is shown standing in front of one of the twelve 16-in. BFD-E two-stage pumps undergoing its official performance test at the plant of United Centrifugal Pumps in Oakland, Calif. The pumps will be installed on the West Texas 24-in. crude-oil pipe line now nearing completion, which will bring West Texas oil to the Gulf Coast. Three 16-in. BFD-E two-stage full head pumps and one 16-in. DVS-E single-stage pump will be installed in series in each station to meet the required pressures. In addition to the main-line booster pumps twenty-nine 20-in. "In-Line" pumps will be installed in the tank farms on the same pipe line. Their ultimate capacity will be 415,000 bbl. per day with a total differential head of 105 ft.

October 4 Set for Zink Process Heating Seminar

Saturday, October 4, has been set as the date for the third annual John Zink process Heating Seminar at the John Zink Co. plant, Tulsa, according to officials of the company.

The seminar was organized in 1950 by Robert Reed, chief engineer of the Tulsa firm, to further dissemination of process information. An attendance of over 400 is expected at the October meeting.

Following the meeting, John Zink will be host at a buffet supper to the attending engineers and operating personnel. Invitations will be issued on request by the company.

Blaw-Knox Expands and Reorganizes Tulsa Office

Chemical Plants Division of Blaw-Knox Co. has expanded and reorganized its Tulsa office into a complete operating unit to be known as the Western Headquarters. F. Drake Parker has been appointed manager. Parker's responsibilities will include the direction of a staff which presently includes some 100 engineers.

This unit of the Chemical Plants Division will provide integrated design, engineering, material procurement, and construction services for the oil, gas, petrochemical and other process industries of the western and southern states.

Parker comes to Blaw-Knox from Badger Process Division of Stone & Webster Engineering Corp., where he has been chief process engineer. Earlier in his career, Parker served as western representative of Houdry Process Corp., chief process engineer of Bechtel Corp., and research supervisor of Union Oil Co. of California.

A-C Service Available In Eastern Montana

The eastern Montana area of the Williston basin is now being served on Allis-Chalmers crawler tractors and motor graders by the newly formed Richland Machinery Co., Sidney, Mont. Charles H. Berner and Wesley Evans,

partners in the new firm, succeed Northland Machinery Co., which formerly had this territory. Richland offers complete service facilities and parts stock to serve owners of equipment lines they represent.

Southern Geophysical Co. Adds to Supervisory Staff

R. E. GATHINGS

VANORDEN

Southern Geophysical Co. has added R. E. Gathings, and K. C. VanOrden to its supervisory staff, Dr. Sidon Harris, president of the company, has announced.

Gathings resigned as vice president and supervisor of Southwestern Consultants, Inc., to join Southern as a supervisor, and is stationed in California. He is a graduate of Sewanee University with a major in physics, and his geophysical experience has been in West Texas, New Mexico, and the Rocky Mountains.

VanOrden has been in geophysical work for 10 years, operating in Texas, Oklahoma, Kansas, Colorado, and Canada. He holds a B. S. degree from Macalester College, St. Paul, with a major in mathematics, and an M. A. degree from University of Minnesota. VanOrden is stationed in San Juan basin in Colorado, and reports to the Rocky Mountain division office in Denver, which is under the direction of Elmer F. Blake, vice president.

Hull Named Butler Mfg. Representative in Illinois

C. W. HULL

Carl W. Hull has been named representative for Butler Manufacturing Co., Kansas City, Mo., it has been announced by G. A. Burns, vice president and assistant general sales manager.

Hull will be responsible for the sale of Butler's oil-equipment line in North Central Illinois. Hull has spent the past 7 years in the oil business, and comes to Butler from one of the major oil companies.

Halliburton Adds Hathorn To Research Department

Don Hathorn has been made manager of Halliburton Oil Well Cementing Co.'s mechanical research and development department, according to an announcement made by L. B. (Preach) Meaders, vice president for field operations.

The mechanical research and development department conducts basic and applied mechanical research on Halliburton services, tools, and equipment. The department is located at company headquarters, Duncan, Okla., and includes 24 engineers; 31 shop, experimental well and compression chambers employes, and 4 others.

Hathorn, patent engineer for Halliburton for 15 years, is a mechanical engineering graduate of Oklahoma A. & M. College.

Ball Is Appointed Sales Advertising Manager

Karl T. Ball has been appointed sales and advertising manager for Instruments, Inc., Tulsa. Prior to joining Instruments, Inc., in September 1951, Ball was employed by McNally -Pittsburg Manufacturing Corp., Pittsburg, Kans., as structural-steel draftsman.

Ball attended Pittsburg State College, Pittsburg, Kansas., where he received a bachelor of science degree in physics in 1950.

Ball was first employed by Instruments, Inc., as chief draftsman, and later served in the electronic and mechanical departments where his work qualified him for his present position.

Van Beckum Is Appointed Director of Research

With the appointment of William G. Van Beckum as director of research and development, The Pacific Lumber Co. has announced plans for further development of redwood byproducts for use in oil-well drilling. Some years ago, the firm introduced "Palco Seal," a redwood-fiber lost-circulation product, which is widely used in the drilling industry. Recently the firm introduced Palcotan, which is finding application as a replacement for quebracho in the conditioning of drilling muds.

Since 1948, Van Beckum has been manager of technical service and assistant sales manager, special products division, Weyerhaeuser Timber Co., Longview, Wash. He is a graduate of St. Norbert College and University of Wisconsin. In 1939 he joined Wood Conversion Co., and in 1942 became chief of the chemistry section of the Weyerhaeuser development department, of which he was named assistant manager in 1946.

Independent Exploration Promotes Broussard, Harkins

Independent Exploration Co. has announced the promotion of C. H. Broussard and Curtis P. Harkins to vice presidents.

C. H. BROUSSARD

C. P. HARKINS

Broussard and Harkins each have been with Independent Exploration since shortly after leaving school. They began as helpers on a geophysical crew and worked up to party chief. After serving as party chiefs, both Broussard and Harkins became geophysicists and were assigned to the general office in Houston. Both men have been with the company for 16 years.

Sweeney New Sales Manager For P&H Diesel Engines

D. E. SWEENEY

Don E. Sweeney, formerly associated with General Motors Corp., is the new sales manager for P & H Diesel Engine Division, Crystal Lake, Ill., succeeding R. H. Fitz, according to an announcement from Harnischfeger Corp.

Sweeney brings to his new position a broad background of experience and ability in the diesel-engine field. His 7 years with G.M.C. were spent in Detroit Diesel Engine Division as zone sales representative and zone sales manager. In these capacities he was in charge of all distributor operations for seven midwestern states. Previously he held the position of district manager for Michigan Public Service Co., and also was associated with Westinghouse Electric Supply Co. in a sales capacity.

(Continued on page 182)

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

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DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

EQUIPMENT FOR SALE

PIPE
All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co., Phone 48070. P.O. Box 151, Tulsa, Oklahoma.

FORT Worth model-D spudder complete with International power unit, tools for 22" diameter holes, $4500. Located near Los Alamos, New Mexico. Inventory furnished upon request. Texas Water Wells, Inc., 951 McCarty Drive, Houston, Texas.

FOR SALE: 1500 ft. new 11# line pipe, 1540 ft. used seamless. All 4½ and range two. C. H. Reser, Hamilton, Kansas. Ph. 2791.

BUCYRUS-ERIE 28-L, trailer mounted, in first-class condition with 65-ft. telescoping derrick complete with casing tackle, strut, auxiliary A-frame leg, and 4-sheave casing blocks. Powered by D-315 Caterpillar Diesel. Price $12,000.00. BUCYRUS-ERIE 24-L, trailer mounted in first-class condition with 55-ft. telescoping derrick. Powered by HP-326 Buda gasoline engine. Price: $5,000.00. Duval Drilling Co., 6505 Normandy Blvd., phone 8-5711, Jacksonville, Fla.

FOR SALE: Cardwell Model "R" Drilling outfit consisting of double drum draw works, powered D-13000, skid mounted 7¼ Oilwell pump, powered D-17000, mast is ninety foot bender, subbases, 10 KW light plant, Linkbelt shaker, steel dog house, traveling blocks, swivel, tongs and rotary table. Write for complete inventory—The Ralph M. Parsons Company 617 South Olive Street, Los Angeles 14, California.

FOR SALE
RECONDITIONED ROTARY EQUIPMENT

1—Wilson Giant Double Drum Single Engine Drawworks with Catheads, Drilling Line, powered with 225 H.P. Waukesha.

2—Unitized 6" x 16" Wilson-Snyder Power Pump, 3 runner Skids, V-Belt Drive and Guard, powered by RXIV LeRoi V-8 Engine.

1—Cardwell Model K Single Drum Rotary Drawworks Unitized on Lowboy Trailer with telescoping poles, powered by SRKU Waukesha.

1—Unitized and Lowboy Trailer mounted—6 x 12 Wilson-Snyder Power Pump with V-Belt Drive and Guard powered by 145 GKU Waukesha.

1—#OB-12-L Brewster Rotary.

8000 Feet—3½" OD Drill Pipe—Good condition.

Above is only a partial list of Reconditioned Rotary Equipment available.

EMPIRE MACHINERY CO.
Box 4025—Phone 4-9181
Odessa, Texas
Box 1978—Phone 4-8196
Abilene, Texas

EQUIPMENT FOR SALE

FOR SALE at Oklahoma City, Attention, T. P. Mace. 40,000' each, 3" and 4" standard, plain end, beveled line pipe, cleaned outside. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

1 MODEL "K" Cardwell Double Drum Spudder. 145 GK Waukesha Motor. Skid mounted. ¾" Drilling 9/16" Sand Lines. These lines are 4000'. Tools for 7" and 5⅛" Hole. Hand Tools Tubing & Rod Tools Complete. Butane Tank, Steel Dog House. This Rig has Folding floor and Roof. Gaines Drilling Co., Box 547, El Dorado, Kansas. Phone 2317.

ONE 36 L Bucyrus-Erie Drilling Machine complete with 7" and 5" Tools, Tool Rack, Light Plant, Dog House, all complete, good lines, ready to go. Will sell right. Will give guarantee same as new unit. Write Texas Well Servicing Company, Box 1357, Borger, Texas. Phone 1721.

PACIFIC
Centrifugal Pumps

41 — 16" Type DMB, 10,000 GPM, 35' Head, 870 R.P.M.

3 — 4" Type IMB, 900 GPM, 1380' Head, 3505 R.P.M.

Write — Wire — Call

Newman's Inc.

Tulsa, Okla. P. O. Box 1865 Ph. 25228—LD 635

FOR SALE
USED REFINERY EQUIPMENT
Located in Michigan

ONE (1)—Vacuum Flash Tower; Top section contains 5 trays on 27" spacing. I.D. is 9 feet. Bottom section contains 5 trays on 27" spacing. I.D. is 6 ft. (11)—18" Manways on ½" thick shell.
ONE (1)—3'6" O.D. Fractionating Tower containing 5 trays on 34" spacing. Design Pressure 25 P.S.I.G.
ONE (1)—8' x 17' Sulphur Tank; ⅜" Shell and Dished Heads.
ONE (1)—4' x 12' Distillate Receiver Tank; ⅜" shell and ½" Dished Heads.
ONE (1)—Water Tower welded; 100,000 gallon capacity mounted on 70' steel supports.
ONE (1)—150,000 gallon storage tank. Welded 16' high x 40' diameter.
TWO (2)—Pressure Tanks—80# 10' x 44'—25000 gallon capacity each. ⅝" shell, ¾" heads.
25,000 square feet of condenser and exchanger surface in various sizes. Expansion Joints; Ring type, 8" to 24". Valves; Electric Motor Driven.
Many other miscellaneous items such as pumps, valves, flanges, tube return bends, stacks, etc.
For further information write or contact Box E-920, The Oil and Gas Journal, Tulsa, Okla.

EQUIPMENT FOR SALE

CATERPILLAR DIESEL GENERATOR
25 KW, 3 phase, 220-440 volts. Excellent auxiliary lighting and power unit. Otis Coles, Jr., P. O. Box 126, El Paso, Texas.

1—Wilson Giant Rotary Rig 800 Transmission. 2—L. I. Cummins Diesel Motors. 1—7¼ x 14 Pump. 1—96' Moore Hi-Speed Mast Rig Complete. 15,000' 4½" O. D.—9.50 lb. Range 1 Casing, New. Box E-936, The Oil and Gas Journal, Tulsa, Oklahoma.

GASO Model 1860, 2½" to 4½" x 6" Duplex Power Pumps—Skid Mounted with Model K-428 BUDA Gasoline Engine—Unit Complete with V-Belt Drive, Belt Guard, etc. — Condition Guaranteed — 6 Available.

HALLORAN EQUIPMENT CO.
5702 Harvey Wilson Dr., Houston 20, Tex.
Phone WAyside 5158, WEntworth 4511

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

ENGINES

3 Waukesha Hesselman Model 6LRHU, 240 BHP at 900 rpm. Brand new. Complete with all accessories, radiator to flywheel, gasoline engine starting. **Convertible for gas operation and electric starting.** $20,000.00 for the lot, f.o.b. New York. Available for inspection.

Box 29, Long Island City 1, New York

PIPE
IMMEDIATE DELIVERY
Subject to Prior Sales

Clean, Straightened & Beveled, Double Jointed or With Couplings.
Mexico and St. Charles, Mo.
APPROXIMATELY 250 miles—8⅝" OD Line Pipe—28.55#, .322 Wall.
APPROXIMATELY 30 miles—12¾" OD Line Pipe—50#, .375 Wall.

Phone, Write, Wire

CONSTRUCTORS' MATERIAL & EQUIPMENT COMPANY
General Delivery, Phone 95, Mexico, Mo.
Box 3216, Phone 8-3378, Tulsa, Okla.

EQUIPMENT FOR SALE

TANK BATTERY: Two 200 barrel welded steel B S & B tanks steel walkaway and stairway, all connections. One 6' by 20' National oil treater. One 8' by 15' B S & B separator with pipe stand. One 122' angle iron derrick. S. & S. Pipe & Supply Company, Box 2513, Phone 50-9287, Tulsa, Oklahoma.

FOR SALE: 186 miles of 6⅝" O.D. x 18.97 lbs. Line Pipe, Single Random Length, Plain Ends beveled for welding and primed, now being taken up in Indiana and Illinois where line was operated under 850 lbs. working pressure. Material available for inspection. For further information please write or call: Commercial Metals Company, P. O. Box 1046, Dallas, Texas, HUnter 4651; Standard Pipe Supply Company, P. O. Box 343, Houston, Texas, CHarter 8978; Texas Pipe Supply Company, P. O. Box 1331, Houston, Texas, BLackstone 0101; Davidson Pipe Company, Inc., 2nd Avenue 50th-51st Streets, Brooklyn 32, New York, GEdney 9-6300.

FOR SALE: 1-43C Heavy Duty Star Spudder A-1 Condition, complete with 10" to 5" Tools, Diesel Power and all necessary equipment to drill wells. Contact A. H. Alcock, Box 146, Office phone #301, Res. phone 2270, Chanute, Kansas.

MACHINE shop equipment, 2 lathes, 1 milling machine, 1 shaper, 1 drill press, 1 bolt threader. Machines driven through line shafts with 1½ hp. and 7½ hp. electric motors. Keyes Drilling Co., Box 1108, Roswell, N. M.

7000 FT. 2½" Upset seamless tubing with ⅞" and ¾" rods. This tubing has been dialogged; in excellent condition. Jay Kornfeld, 1121 Union National Bank Building, Wichita, Kansas. Phones 42121, 60996.

FOR SALE: Near Maud, Okla., horizontal gasoline storage tanks as follows: Two 10' x 30', Four 8' x 30', One 8' x 25', One 7' x 27'—disconnected and ready for truck movement. For data, contact Cities Service Oil Co. Patridge, Bartlesville, Oklahoma.

FOR SALE: 5,000 8⅝" O.D. Used 8-V recessed couplings off of 28.55# pipe that is clean, the dutchmans having been removed with a machine thread in perfect shape. Will sell any part for $1.50 each F.O.B. Shreveport, La. Contact A. A. Gilbert Pipe & Supply Co. P. O. Box 986 or Phone L. D. 97.

FOR SALE: One 36-L Bucyrus-Erie drilling machine, complete with tools. Also 1,942 ft., new 7 inch, 17 lb., H-40, range 2, seamless casing and 2,409 ft. of new 2⅜ inch, 4.60 lb., range 2, J-55, seamless regular tubing. Box E-812, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE
USED PUMPING GAS ENGINES

16—Allis-Chalmers 4 cyl. type W-25.
18—Buda 4 cyl. type HP-217.
17—Hall Scott 4 cyl. type 167.
29—Minn. Moline 4 cyl. type KEF.
7—Minn. Moline, 4 cyl. type 206-A-4-A.
10—Minn. Moline 4 cyl. type 165-4-A.
30—Other miscellaneous makes and types, some 6 cylinder. All in running condition when removed from wells. A majority of the above have Twin Disc industrial clutch, magnetos, electric starters with cannon receptacles and oil filters. All for skid or slide rail mountings. Engines available due to electrification of pumping units.

USED DRILLING EQUIPMENT

5—12" x 12" twin drilling engines.
1—11" x 11" O.W. twin drilling engine.
6—12" x 12" single drilling engines.
3—14" x 14" twin drilling engines.
1—66" Ideal type C, 4 Sheave traveling block.
1—9" Ideal casing hook.
6—15½" x 8½" x 20" Ideal slush pumps.
3—16¼" x 7¾" x 20" O.W. slush pumps.
1—14" x 7¼" x 14" Ideal slush pump.
6—14" x 7¼" x 14" G.D. slush pumps.
2—10" x 5" x 10" Ideal feed pumps.
4—10" x 4½" x 10" O.W. water feed pumps.
2—7" x 4½" x 10" O.W. water feed pumps.

All above sold "As is—Where is."

STANDARD OIL COMPANY OF CALIFORNIA
P & S Dept.—Taft, California
Attn.: P. A. Cline—Phone Taft 5-2111 or write or wire

EQUIPMENT FOR SALE

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

NEW G-M 6-71 Diesel; installed but never used. Flywheel for Twin Disc 10,000 Series torque converter. Will sell for less than O.E.M. price. Muskogee Iron Works, Muskogee, Oklahoma.

FOR SALE: Used 36-L "Bucyrus-Erie" Drilling Unit, Bare Machine with Casing Tackle Strut, now in use, will be available October 1st. E. K. Carey, Contractor, Box 620, McPherson, Kansas. Phone 341.

6,000' OF 4½" API. Full Hole Sonoscoped Drill Pipe. Also 4,000' of 3½" External EUE Drill Pipe. Milford Giffin, Tel. 477, Hoisington, Kansas.

FOR SALE: One Wilson Mogul Double Drum Spudder equipped with rotary drive attachment, chain driven transmission, friction clutches in both drums, lower drum with two drives, upper drum with one drive, water circulating brakes on lower drum and with Foster friction spinner cathead and American Simplomatic breakout cathead. Powered by Waukesha 6-WAKU gas engine equipped with butane heat exchanger. Spudder has been completely reconditioned and motor is in excellent running condition. Has not been run since overhaul. Rig will be given 90 day guarantee. Priced reasonable. Box E-937, The Oil and Gas Journal, Tulsa, Oklahoma.

1—28-L BUCYRUS-ERIE Spudder complete with all tools, electric welder, light plants, dog house, GMC 6x6 Army truck and 1948 Federal truck inventory furnished upon request. Price: $13,000.00. Buckeye Supply Company, Zanesville, Ohio.

WELL drilling equipment, new or used. Spudders, rotaries, core & shot hole drills, tools, pipe, bits, blocks, pump jacks, valves. Everything for well drilling and service. Fishing tools rented. Pressey & Son, Pueblo, Colo.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

WE BUY well drilling equipment machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WANTED: Three engine compound for Wilson Titan drawworks. Makin Drilling Company, Box 1628, Phone 3-3141, Hobbs, New Mexico.

WANTED: 1—Boiler approx. 25,000 # Steam per hour 200 # WP. 1—Vacuum Jug approx. 8' dia. with trays. 1—Crude Oil Fractionator 8' dia. with 20 to 25 trays. Send price and full particulars to Northwestern Refining Co., St. Paul Park, Minnesota.

WILL purchase any amount up to 7500' of Good Used 3" Upset Seamless Range 2 tubing. Must be in good condition. A. A. Gilbert Pipe & Supply Co., Shreveport, La. P.O. Box 986, or Phone L.D. 97.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Greer Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale? Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

USEFUL MECHANICAL PRODUCTS
needing
Introduction and Sales Representation
to
Oil—Gas—Chemical industries located in Ohio, West Virginia, and Western Pa.
by
Engineers with well developed contacts
Box E-936, The Oil and Gas Journal
Tulsa, Oklahoma

EQUIPMENT WANTED

WANTED: 1 mile of 3" I.D. Line Pipe, also high pressure Gas Separator. Call Mr. Griffith, #2-3052, Tulsa, Oklahoma.

WANTED: Laboratory equipment, gum testing apparatus, air jet and ind period. Send full particulars to Northwestern Refining Co., St. Paul Park, Minnesota.

HELP WANTED

WANTED: Purchasing agent for refinery and production operation. Must have sufficient experience in accounting ability to maintain perpetual inventories, meet government purchasing requirements, etc. Box E-939, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, CHEMICAL. Excellent opportunity with small, well established engineering company. Wide scope of independent work on process, design, operations, economies, patents, etc. Attractive location and working conditions. Some travel. Box E-929, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Man for investigation and purchase of oil and gas leases in proven fields. Must have background of administrative, as well as operations experience. Salary and expenses to a high caliber man. Box E-955, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY EXECUTIVE

Independent integrated petroleum company has opening for manager of moderate size complete refinery. Experience with modern processing, labor relations, cost control, as well as organizing ability essential. Salary open. Prospects for the future are exceptionally good for a qualified man. All replies confidential. Box 930, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER REQUIRED

Graduate Engineer, fully experienced in Oil Refinery Engineering, to handle senior engineering detail of a modernization and expansion project for an Independent Refinery in Western Canada. Permanent position in senior capacity following completion of project. Please give full information, including age, education, experience and salary expected in first letter.

Box E-925

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

GEOLOGIST

For subsurface work in Saudi Arabia. Degree plus 5 years' experience in well-sitting, and with some knowledge of micro-paleontology. Salary open.

Write giving personal history and work experience. Please include telephone number.

Box E-924

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

SALES REPRESENTATIVE WANTED

Established Plastic Pipe manufacturer wants high grade man of experience as general sales representative in Mid-Continent field. Write giving full information including salary requirement in first letter.

Box E-933

The Oil and Gas Journal
Tulsa, Oklahoma

HELP WANTED

WANTED: Experienced seismic party chiefs, observers and computors for service in Central and South American countries. Must be prepared to fulfill two year contracts at appropriate salary. Assignments starting not later than December 1952. Write giving details of experience and education. Letters will be held confidential. Box E-928, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMIST for western Kansas refinery. To be responsible for refinery products control. Prefer some asphalt experience. Permanent position. Salary commensurate with experience and ability. Box E-942, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN with Law Degree. Independent Oil Company has opening for experienced landman with legal experience in South Texas area. Reply giving full particulars regarding education, experience and qualifications. Box E-941, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMIC PERSONNEL needed for United States and Canada by well known and expanding contract geophysical company. Address Box E-963, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

PETROLEUM ENGINEER wanted by independent oil company in West Texas. Require two to four years working experience in drilling and production. Reply in detail stating education, experience, age, marital status and starting salary desired. Box E-958, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM GEOLOGIST wanted in West Texas by independent oil company. Desire one to three years of practical experience in sample work and subsurface mapping. Reply should give experience, education, age, marital status and starting salary required. Box E-959, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Petroleum Engineer with from two to five years' experience wanted for work on staff of large independent producer. Duties involve subsurface geology, development, production, and reservoir engineering in California or Rocky Mountain area. Give references, details of education and experience in first letter, and enclose photograph. Box E-956, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERS, GEOLOGISTS, DRAFTSMEN, with field experience for Rocky Mtn. positions. Good future with both Majors and Independents. Write Professional Placement Service, 516 University Bldg., Denver, Colorado.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628. Ph. No. 3-3141, Hobbs, New Mexico.

EXPERIENCED SALES ENGINEER

Now Ready to Take On Additional Oil Field Equipment Accounts Requiring Technical Selling, on Commission Basis.

For manufacturers without distribution outlets, this is the best, quickest, and most economical way to market your equipment. Completion of successful establishment of present line permits immediate acquisition of one or two more products requiring technical selling. 15 years experience in development and distribution of oil field equipment.

Box E-965, The Oil and Gas Journal, Tulsa, Oklahoma

SITUATIONS WANTED

PRODUCTION SUPERINTENDENT. Graduate Petroleum Engineer. 12 years responsible experience producing industry. Geological ability. Mid-Continent or Rocky Mountains. Box E-774, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTING Major Desires Change. 3½ years experience, payroll, audits, income tax, reconciliation statements, paying bills, etc. Prefer Midwestern or Rocky Mountain. Box E-931, The Oil and Gas Journal, Tulsa, Oklahoma.

PROJECT Engineer-Estimator: Processing and boiler plants, utility and high-pressure piping, material-handling, structural framing, heavy foundations; present salary, $9,000. Box E-952, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer. Five years experience in production, reservoir engineering, and consulting work desires association with aggressive independent or consultant in southwest. Licensed. Box E-948, The Oil and Gas Journal, Tulsa, Oklahoma.

SURVEYOR: Twelve years world-wide experience in construction, exploration and topographic work, requires overseas contract. Box E-957, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer desires to supervise drilling, completions and production for independents in West Central Texas on retainer basis. Box E-946, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—Age 35—married—10 years major company experience in Arkansas, Mississippi, Louisiana, East and West Texas—desires position with small major or independent oil company, located in Fort Worth or Dallas area. Box E-950, The Oil and Gas Journal, Tulsa, Oklahoma.

CORROSION ENGINEER, Ph.D. Chem. Eng. (1942). Nine years experience directing development and application of corrosion inhibitors in petroleum production and refining. Publications and patents. Desires responsible position in West, or foreign. Box E-954, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL Engineer, M.S.Ch.E. Univ. of Michigan, 34 years old, presently employed. Three years diversified experience in Pilot Plants, Process Design and Technical Service. Desires Sales or Field Engineering in Mid-Continent Area. Box E-921, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPE LINE Supervisor, experienced in design and construction of manual or remotely operated pipe line systems using microwave or teletype control, desires position with progressive corporation. Box E-962, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM ENGINEER: Eleven years experience in development and operation of primary and secondary production in Texas Panhandle, Kansas and Oklahoma, six years as assistant superintendent. Now employed by a major oil company. Desire position with growing independent as superintendent or district engineer. Box E-961, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY Executive, 19 years broad experience in Engineering, Operations, and Administrations. College degree in Engineering. Executive training. 40 years old. Married. Available October 1st. Box E-960, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTORNEY

Four years experience in legal department of Gas Producer wants new job paying $450.00 per month starting salary. Experience in Abstracts, Title Opinions, determination of mineral and leasehold ownership; condemnation of right-of-ways, Polution, Riparian, and Division of Royalty Cases; will work in either Legal, Land, or Leasing department of Oil or Gas Company. References and interview at Convenience of Employer. Age 37, 6 dependents, 2 degrees.

P. O. Box 584, Phone 8-4862, Tulsa, Okla.

STANLEY R. TILLER

SITUATIONS WANTED

PURCHASING Agent, Expediter, 27, BBA., MBA-Columbia. Diversified experience fittings, valves, pipe, oil drilling equipment, machine shop, priorities, factory-office liaison. Desires work NYC. Mr. W. Bilder, 1860-72 Street, Brooklyn, N. Y.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

ROYALTIES

260 ACRES Leases, 50 acres land owner's royalty. Originally 1000 bbl. oil wells, 12 M. gas vicinity. Pipe line, 38 gravity oil. ⅛ interest lease, royalty, well drilled through Dutcher sand, $4500.00 cash. L. Price, Coweta, Okla.

WILLISTON BASIN ROYALTIES

Dealers in Montana royalties since 1921, we now specialize in royalties under major company leases in the Montana portion of the Williston Basin. For information on our method of operation, write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

JACK EAGLE—Pay you immediately for your producing royalties and Overrides, absolutely no delay, send complete details. 706 City Nat'l Bldg., Okla. City, Okla. REgent 6-7027.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates or write The Oil and Gas Journal.

PRODUCTION

We Will Buy

PRODUCING landowners royalty and producing leases. Any amount, any area. Confidential information required and furnished. A 1 Bank Reference.

COMBEST ROYALTY COMPANY
825-826 Amarillo Bldg.
Amarillo, Texas

LEASE AND DRILLING BLOCKS

WILL give 112 acre lease for 90 day drilling contract, 1 year lease, 5000' test. One time good producer, location Young County, Texas, Mary E. Criswell Survey, Abstract #1772, known as the J. W. Burnett sub-division Section 2, Block C. Reserve right to withdraw offer any time. Inquire Box 722, Clifton, Arizona.

FOR LEASE: The owners of the land and/or the mineral rights on 75,000 acres in Northeastern Louisiana would like to secure proposals for exploration and development on large or small acreages. One producer on the tract. Box E-864, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

FOR SALE: Oil & Gas Leases and Drilling Blocks and Royalties. Write Harvey Daugherty, White Run, Kentucky.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

LEASES ROYALTIES

Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

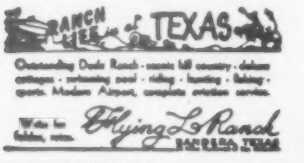
REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

CAPITAL AVAILABLE

IMMEDIATE Capital Available for laying pipe lines and gathering systems in Texas. We are also interested in purchasing actively operating pipe lines and gathering systems. Box E-934, The Oil and Gas Journal, Tulsa, Oklahoma.

RESORTS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Central Area

(Continued from page 171)

Sun Oil Co. 1 Kuehn, NE NW NE 36-3s-10w, temporarily abandoned 1,660 ft.

Knox County: Aux Vases Oil Corp. 1 Perry, SE NW SW 2-1n-8w, dry, TD 1,472 ft.

Regional Development Co. 1 Daugherty, Survey 21-1n-10w, dry, 1,943 ft.

Carter Oil Co. 1 Richter, SE SE SW 24-5n-8w, dry, TD 1,274 ft.

Pike County: National Associated Petroleum Co. 1 Lemmons, NW NW NE 36-1s-7w, dry, TD 1,246 ft.

Posey County: Illinois Mid-Continent Co. 1 Schneider, SE SE SE 24-4s-12w, dry, TD 2,644 ft.

Skiles Oil Corp. 1 Hunter, SE SW SE 4-4s-13w, dry, TD 2,118 ft.

Calvert Drilling, Inc., 1 Reese community, SE NE NE 13-5s-12w, dry, TD 2,832 ft.

Vigo County: Turney-Cooksey 1 Dickerson, NE NE NW 25-12s-8w, dry, TD 1,647 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Buchman & O'Neal 1 Pritchett, SE NW SE SE 19-O-24, IP 50 bbl., Aux Vases lime 2,430-42 ft., TD 2,610 ft. (extension Niagara New pool).

WESTERN KENTUCKY WILDCAT FAILURES

Henderson County: G. L. Reasor 1 Lambert, SL NW NE SW 3-P-24, dry, TD 2,566 ft.

Hoskins County: Skiles Oil Corp. 1 Moore, N½ NE SE SE 10-I-26, dry, D 705 ft.

R. E. Hupp and Ashland Oil & Refining Co. 1 Corum, NE NW SW NW 12-L-26, dry, TD 2,839 ft.

McLean County: Charles Morburger 1 Cummings, EL SE NE NE 23-N-25, dry, TD 1,600 ft.

Muhlenberg County: Basin Drilling Co. and W. Sergent, NE SW SE SW 6-I-27, dry, TD 2,060 ft.

Union County: Fisher Oil Co. 1 K. S. Johnson heirs, NE SW NE NW 14-P-20, dry, TD 2,646 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Heath Township: Cook Drilling Co. 1 Lemoin, SE SE SW 26-3n-14w, Traverse 1,478 ft., dry, TD 1,514 ft.

Overisel Township: Paul E. Cholette, Trustee 1 Hulst, NE NE SW 1-4n-14w, Traverse 1,593 ft., dry, TD 1,620 ft.

Bay County, Pinconning Township: C. W. Collin 1 Hasso, NW NE SW 31-17n-5e, Dundee 2,779 ft., dry, TD 2,960 ft.

Isabella County, Broomfield Township: I. W. Hartman & Northern Plains Petroleum Co. 1 Renwick, NE SW SW 33-14n-6w, Dundee 3,694 ft., dry, TD 3,706 ft.

Oceana County, Golden Township: Allied Petroleum, Inc., 1-A Munger, SE SE NW 8-15n-18w, Dundee 2,138 ft., dry, TD 2,201 ft.

EQUIPMENT MEN

(Continued from page 178)

Caterpillar Names Oil Consultant at Tulsa

R. E. (Gene) Sterrett has been appointed by Caterpillar Tractor Co. as special representative and consultant on power for oil-drilling equipment in the Tulsa area. Sterrett's services will be available to all manufacturers and distributors of oil-well-drilling equipment whose customers are interested in using Caterpillar diesel-engine power.

Sterrett is a graduate of the mechanical engineering school at Kansas University, and has a background of actual shop and assembly work at the Caterpillar Tractor Co. plant in Peoria. More recently his experience has been in the company's industrial sales division during which he has worked closely with Caterpillar engine customers in the oil industry.

Hinderliter Appoints Export Distributor

Hinderliter Tool Co. Division, H. K. Porter Co., Inc., Tulsa, has appointed Petroleum Machinery Corp., New York, as its exclusive export representative in all foreign countries with the exception of Mexico and Canada.

Petroleum Machinery Corp., more commonly known as "Petromac," is headed by Bill Campbell, well known in the oil-field-equipment industry.

Raybestos-Manhattan Opens New Houston Warehouse

Raybestos-Manhattan, Inc., has announced the opening of a new Houston warehouse, which offers larger quarters with ample stocking facilities for servicing the expanding Gulf Coast industrial area. The warehouse is in charge of M. C. Nugent, and operates under the Dallas office, E. W. Nagel, manager.

The company also has announced the appointment of Webster-Robinson Machinery & Supply Co., Inc., as a new distributor of belting, hose, and other industrial rubber products in the Tacoma, Wash., area.

Barksdale Valves Names Nelson to Top Position

L. S. BARKSDALE

M. C. NELSON

L. S. Barksdale has announced the incorporation of Barksdale Valves, and the promotion of M. C. Nelson from general manager to vice president, and director of the Barksdale organization.

In his new position Nelson will direct the expanding sales activities of the corporation, which is now represented in 40 major industrial areas. All these representatives offer sales and service facilities for Barksdale manual and solenoid "Shear-Seal" valves, Meletron pressure switches, and Crescent solenoid valves.

Gilmartin Promoted to General Sales Manager

The appointment of John R. Gilmartin as general sales manager of the Hyatt Bearings Division of General Motors in Harrison, N. J., has been announced by R. H. Cramer, general manager. Gilmartin succeeds Howard K. Porter who has been named assistant to general manager on special assignments.

Gilmartin joined Hyatt Bearings Division in Detroit upon his graduation from the University of Michigan in 1929. There he was first associated with the engineering department and subsequently became a sales engineer before his transfer to the Hyatt home office in 1941. At Harrison he assumed charge of all government contracts and priorities, and later served as assistant production manager until 1947 at which time he was appointed assistant to the general sales manager.

Porter joined Hyatt Bearings Division in 1916, and during the years held various engineering and sales positions at Harrison. In 1926 he became assistant general sales manager and in 1930 was made general sales manager.

Canadian Fields

(Continued from page 169)

the Gaspe peninsula and 1,947,000 acres covering the entire island of Anticosti in the St. Lawrence. The Associated interests are planning a multimillion dollar development program.

Ontario.—In Aldborough Township, Elgin County, south of Wardsville, Western Ashley, drilling on the George Rogers farm has encountered a gas flow, estimated 500,000 cu. ft. in the Guelph-Niagara horizon.

In Lambton County, a deep test by Imperial Oil on the Robert Capes farm at the junction of Brooke, Warwick, Plympton and Enniskillen townships has been abandoned at 2,265 ft. The well was designed to test the deeper formations of the Watford shallow oil field, which about 1938 secured commercial production in several wells. Drilling was handled by Floyd Stubble of Merlin.

with light green high gravity paraffin-base crude seeping from old wells drilled 50 years ago and improperly located; while halfway down the southwest flank, live oil seepages show black asphalt-base crude. Continental 1 Gaspe, on the crest of this dome, yielded a small commercial production of light crude at 928 ft., and the deep test is planned to penetrate the lower asphaltic crude horizon.

Quebec Oil 2, on a 23,040-acre concession on the Power-Joncas dome controlled by Quebec Oil Development, is below 557 ft., with production expected around 2,000 ft.

Further development is planned through a new organization, Associated Developments, Ltd., which has secured from a province of Quebec concessions totaling 1,502,160 acres on formation estimated to have been penetrated at 6,559 ft.

Continental Deep Test 1, on the Galt Brook dome, 17 miles west of Gaspe village and just north of the York River, and testing 17,698 acres blanketed by Gaspe Oil Ventures, is below 2,520 ft. Structure shows a north to south syncline and an east to west plunge,

LEGAL

Sealed bids for oil and gas mining leases on 742.19 acres of trust lands on the Crow Indian Reservation, Big Horn County, State of Montana, will be received at the office of the Superintendent, Crow Indian Agency, Crow Agency, Montana, up to 2:00 o'clock P.M., Mountain Standard Time, September 26, 1952. For further information, call or write L. C. Lippert, Superintendent, Crow Indian Agency, Crow Agency, Montana.

LEGAL

42.72 ACRES of restricted Allotted Indian lands located within the jurisdiction of the Uintah and Ouray Indian Reservation, in Uintah County, State of Utah, in Township 10 South, Range 23 East, Salt Lake Base Meridian, are being advertised for oil and gas lease sale, bids on which will be opened September 25, 1952, at 2:00 P.M., at the office of Harry W. Gilmore, Superintendent, Uintah and Ouray Agency, Fort Duchesne, Utah. Full particulars may be obtained from the office of the Regional Oil and Gas Supervisor, U. S. Geological Survey, Casper, Wyoming, or from the Uintah and Ouray Agency."

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the SE¼NE¼ sec. 15, T. 44 N., R. 98 W., 6th P.M., Wyoming, 40 acres, within the known geologic structure of the Hamilton Dome field, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p. m., Eastern Standard Time, on September 24, 1952, when bids will be opened. Details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to the Manager of the Land and Survey Office, Cheyenne, Wyoming, or to this office. Marion Clawson, Director.

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LEGAL

U. S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT, Washington 25, D. C. Notice is hereby given that two parcels of land in T. 5 S., R. 104 W., 6th P.M., Colorado, containing approximately 232 acres, within the known geologic structure of the Urado field, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p. m., Eastern Standard Time, September 17, 1952, when bids will be opened. The details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to the Manager of the Land and Survey Office, Denver, Colorado, or to this office. Marion Clawson, Director.

LEGAL

U.S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the SE¼SE¼ sec. 10, T. 19 N., R. 5 E., La M., containing 40 acres, within the known geologic structure of the Monroe field, Louisiana, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard Time, on September 24, 1952, when bids will be opened. Details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to this office. Marion Clawson, Director.

The Surveyor's Notebook

Reporting on Unusual Surveying Problems and Their Solutions

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Tractor and Level Whip Texas Mud Flats

"Recently we had a job which, at first, seemed routine – locating exterior boundaries of a Texas ranch," writes G. W. Herzog, Chief, Drafting-Surveying Division, Shell Oil Company. "Although the original Mexican grant placed the eastern boundary on shores of a lagoon and tides were involved, we anticipated no real difficulty.

"Inspecting the coast line, however, revealed several hundred acres of accreted land. Our problem soon became one of locating a line across mud flats. The land had to be contoured–accurately and quickly. A close grid pattern seemed logical.

"We soon found we had misjudged the work. Our closed transit traverse was over 25 miles and some parts of the flats were over three miles across. Worst of all, by the time field work began, hard winds had covered the flats with water.

"Using temporary bench marks of pine, we ran a base line. Where bench marks were any distance at all from the shore, the flats were soft and slippery. Instruments couldn't be kept level on a standard tripod. And with so many setups, platform building at each point was out of the question.

On tractor, one man keeps instrument level while other is taking the rod readings.

"A light caterpillar tractor was then suggested as a surveying aid. We widened its treads to 26 inches, and a platform for the instrument man was built to the width of the treads and slightly longer. A metal frame, clearing the motor, was welded to the platform; a base of plywood fastened to the frame; and a shortened tripod bolted to the plywood.

Surveying Texas mud flats, Shell Oil Company party uses tractor with platform built for level.

"This procedure proved best: tractor was placed with longitudinal axis at right angles to, and a few feet from, the line–and about 1500 feet from the turning point. While one man kept the instrument level, a second took readings. When rod passed tractor, the men changed jobs to prevent any rocking motion.

"We completed the work in one-fifth the time required by conventional methods. Again, surveyors overcame Mother Nature."

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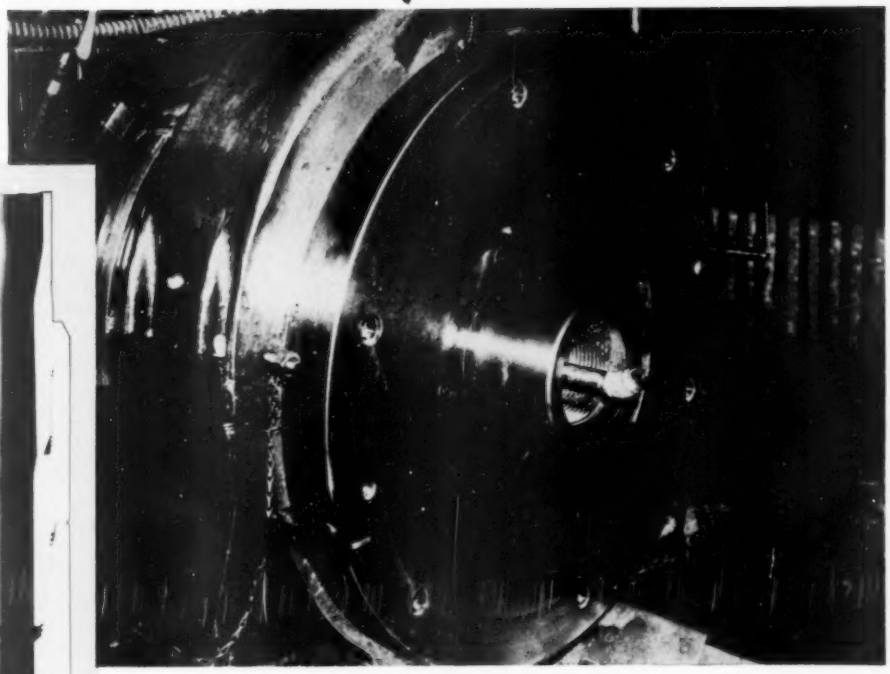

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